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H, the eighth letter of the English alphabet, is derived in form from the Phœnician character, which was but an *H* closed at top and bottom with a line. In sound, the Phœnician letter resembled the German *ch*, but in early Greek it corresponded nearly to our *h*. *H* in English is called the *aspirate*, as it is a mere breathing, with the vocal organs in the position demanded by the following vowel. It is very commonly joined to other consonants to represent sounds for which there are no special letters in the alphabet, as in the digraphs, *ch*, *sh*, *th*, or in other consonantal combinations of various origins and values, as in the words *enough*, *plough*, *philosophy* or *rhetoric*.

Haakon, *haw'kon*, the name borne by six Norwegian kings in the Middle Ages. It was adopted by Prince Charles of Denmark, who came to the throne of Norway in 1905 as Haakon VII. HAAKON VII (1872-), is the son of Frederick VIII of Denmark, and his wife is the daughter of Edward VII of England. On the breach between Norway and Sweden (See NORWAY, subhead *History*), the Storthing invited Prince Charles to assume the crown, and their choice was approved by a large popular vote. King Haakon was trained in the royal navy and his love for and knowledge of the sea had much to do with making him popular with the sea-loving Norwegian nation.

Haarlem, *hahr'lem*, a town of Holland, capital of the province of North Holland, 10 mi. w. of Amsterdam. It is well built and is one of the most attractive cities in Holland. Among the chief structures are the cathedral of Saint Baro, the townhall, a library and several churches. The industrial importance of Haarlem, as well as its population, is less than what it was formerly. It still has various manufacturing establishments and a celebrated type foundry, the oldest and most famous printing office in Holland; and its flower trade, especially in hyacinths and other bulbs, is very important. It is the birthplace of Laurence Coster, believed by the Dutch to be the

inventor of movable types (See PRINTING), and of a number of painters, Ostade, the Wouwer-mans, Ruisdael and Van Loo. Haarlem took a leading part in the revolt of the Netherlands and in 1572 was besieged by the Spaniards, to whom it surrendered after a heroic siege of seven months. In 1577 the city became a part of the Netherlands. Population in 1900, 65,189.

Habak'kuk, the eighth of the twelve minor prophets. He flourished about 600 B. C., at the time of the invasion of Judah by the Chaldeans, and prophesied that God would punish them. Chapter III of the book of *Habakkuk* is remarkable for the majesty of its language and the sublimity of its thought.

Hab'berton, JOHN (1842-), an American story-writer, born in Brooklyn, N. Y., and educated in the public schools there. He learned the printing trade and then began editorial work. He is best known as the author of *Helen's Babies* and many other stories of child life, including *Trij and Trixy* and *The Worst Boy in Town*.

Hab'beas Corpus, in law, a writ addressed to one who has a person in custody, commanding him to produce the body of the person named at a certain place and time. It is usually employed to secure the trial of the question as to the lawful imprisonment of one who claims to be innocent. The protection of *habeas corpus* is secured to American citizens by the Constitution of the United States and by the constitutions of most of the states. The state courts do not discharge persons imprisoned by order of Federal courts, nor will the Federal courts interfere with persons imprisoned under state process.

In times of rebellion or disturbance the government may find it necessary to arrest dangerous persons and to detain them in custody without bringing them to trial. In such cases, the Constitution provides, the privilege of the writ may be suspended. Whether the power of suspension rests with the president or with Congress has long been disputed, the latter opinion being probably correct. During the Civil War, the

question aroused great interest when President Lincoln suspended the privilege by proclamation. His act was later legalized by Congress. See **WARR**.

Habit, a customary act of body or mind, particularly one that has become so firmly fixed by repetition that it is performed automatically, involuntarily and sometimes unconsciously. Habit is the result of the tendency of the nervous system to act again in the way it has acted before. No satisfactory explanation of this tendency has been found, but physiological psychologists agree that it is due to some change which the act produces in the nerves acted upon. The character of the change is not understood. The theory is that when a current of nerve force once traverses a nerve tract, it produces such a condition in that tract as to make it easier for the current to traverse it again, and that the more times the current traverses the tract, the easier its passage becomes, until the nerves become so habituated to the passage that the only volition necessary to the act is that which starts it.

As bodily habits are formed by repeated muscular movements, so are mental habits formed by repetition of the same mental act. This is what is meant by saying that any mental power, as memory, imagination or will, is developed by use. The person whose memory is well trained during childhood has a good memory through life; likewise, one whose will has received proper culture before he is twenty years of age, has developed a power of decision and action that will usually assure him success in his chosen occupation.

All acts which become habits first occur as reflex or impulsive acts, and their performance is usually unconscious, though one becomes conscious of them after they have been performed. By repetition attention is called to these acts, and the desire to imitate causes the child voluntarily to attempt them. If the act is complex, his first attempts are attended with a considerable degree of effort, as in learning to walk. Here the former reflex and impulsive movements of the limbs are placed under control of the will for a definite purpose, and for some weeks the successful accomplishment of the act requires the child's entire attention every time he attempts it. But day by day the nerve currents traverse the required tract more easily and require correspondingly less attention, until finally the movement becomes automatic and the child sometimes becomes so absorbed in other matters that he is unconscious of the fact that he is walking and travels past the point where he intended to stop.

During childhood and youth the nervous system is in a plastic condition and can easily be trained in any direction; hence it is during this period that most of the habits of life are formed. It is therefore all-important that early habits be such as will contribute to the individual's highest good—physical, intellectual and moral. In order that this result may be secured, the child should be trained to do things in the right way, to speak correctly and to choose the right. After twenty, important habits are seldom formed, and after thirty, new habits are acquired with great difficulty. In order that a habit may be formed, success should be secured at the outset. Failure leads to discouragement and often to the abandoning of the attempt. When the choice is made and the habit is once launched, every opportunity to practice it should be embraced until it becomes firmly established. All acts or thoughts which tend to interfere with the formation of the habit should be set aside.

Habit saves time and strength. Were each successive act as difficult as the first, the most common and necessary movements would consume all one's vitality and one could never make progress. By making our common acts habitual, the mind is left free to exercise its powers on higher things. Were it not for this, memory, reason and will would never be properly developed and that progress of thought which has produced our present civilization would have been impossible. Habit also gives us skill in execution. It is only as we become unconscious of the movement and fix our attention upon the result that we execute our work skilfully. Habit is the great conservator of society. It keeps the various classes of people at their chosen vocations. The miner cannot easily become a mechanic, nor the merchant a physician, and whatever longing a man may have for another calling, after he has become thoroughly established in a given occupation he seldom changes. Habit is the result of will power and determines character. "A well-trained nervous system is the greatest friend that the mind can have. An ill-trained nervous system is a relentless enemy to the highest mental powers." See **WILL**. Consult Radestock's *Habit in Education*; James's *Psychology*, *Briefer Course*; Halleck's *Education of the Central Nervous System*.

Habsburg, *hahps'boorg*, **HOUSE OF**. See **HAPSBURG**, **HOUSE OF**.

Hack or **Hackney Coach**, a term loosely applied to a carriage used for hire. *Hack* is derived from hackney coach, and in the United

Hackberry

States the term usually means the same as cab.

Hack'berry, also called nettle tree, sugar berry and hoop ash, the name of a number of trees which belong to the same family as the nettles and which are found in various parts of the northern hemisphere. The best known species is a large tree which grows in the Western United States. It has a rough bark and nearly horizontal branches, and it may be used in much the same way as the elm. There are two species, of which the smaller, more generally known as the sugar berry, grows in the southwestern part of the United States.

Hack'ensack, N. J., the county-seat of Bergen co., 8 mi. s. e. of Paterson, on the Hackensack River and on the New Jersey & New York and other railroads. The village has silk mills and manufactories of jewelry, wall paper and other articles, but it is preëminently a residence place. The town was first settled by the Dutch about 1640, near a village of the Hackensack Indians. During the Revolution Washington stopped here in his flight across New Jersey, and the town was later occupied by British and Hessians. Population in 1905, 11,098.

Hack'ett, JAMES KETELTAS (1869-), an American actor, born at Wolf Island, Ontario. He was the son of James H. Hackett, a well-known American actor, and graduated at the College of the City of New York. He made his debut in 1892 at the New York Lyceum, at the age of twenty-three, being at the time the youngest leading man in the history of the New York stage. His most notable successes have been in *The Prisoner of Zenda* and its sequel, *Rupert of Hentzau*, and *The Pride of Jennico*. He also appeared in *The Crisis*, a dramatization of Winston Churchill's novel. In 1897 he married the actress Mary Mannering and subsequently appeared with her in various successful plays, notably *The Walls of Jericho*.

Hackles. See HECKLES.

Haddock, a well-known fish of the cod family. It is smaller than the cod, which it much resembles, and it has a dark line along its side and a dark spot just behind the head. This fish commonly weighs from two to six pounds, though sometimes it weighs as high as ten pounds. It breeds in immense numbers in the northern seas in February and March and constitutes a considerable article of food. It is plentiful on the coasts of America, from New York to the Arctic regions. While not as valuable as the cod, the haddock is an important

Hadrian

food fish. When dry-salted it is placed on the market as *finnan haddie*.

Hades, *ha'deez*, originally, the Greek name of the ruler of the lower world, afterwards known as Pluto. The name Hades was in later times applied to the region itself, which was supposed to be the abode of all departed souls, whether good or bad. The term is also used in the Greek scriptures to designate the home of the dead.

Had'ith, the Arabic name for a fable or tradition, specifically applied to the stories of Mohammed, which, with the Koran, form the final authority in questions of Mohammedan theology.

Hadj or **Haji**, *haj*, the Mohammedan pilgrimage to the Kaaba at Mecca, which every Mohammedan is bound to perform once in his life, if his health and means permit, after which he is entitled to prefix *Hadj*i to his name. The pilgrimage was made in disguise by Bueckhardt in 1814, by Burton in 1853 and by T. F. Keane in 1878, each of whom published accounts of the journey.

Hadley, ARTHUR TWINING (1856-), an American educator, born at New Haven, son of James Hadley. He was educated at Yale and at the University of Berlin. After completing his studies abroad, he became tutor at Yale and later professor of political science. In 1899 he was elected president of the university. Doctor Hadley attained more than a national reputation by his writings on financial and economic subjects, on both of which he is considered eminent authority. He has been president of the American Economic Association and is the author of *Railroad Transportation, its History and Laws*; *Report on the Labor Question*; *Economics*; *An Account of the Relations between Private Property and Public Welfare*, and *The Education of the American Citizen*, besides a large number of articles which have appeared in the leading periodicals.

Ha'drian, (76-138) fourteenth Roman emperor. His father, who was a cousin to the emperor Trajan, died when he was ten years old and left him under the charge of his illustrious kinsman. He married Sabina, Trajan's grand niece, accompanied the emperor on his expeditions, filled the highest offices and, on the death of Trajan, assumed the government as his adopted son (117). He made peace with the Parthians, renouncing all conquests east of the Euphrates, and bought off a war with the Roxolani by the payment of a sum of money. From the year 121 he spent most of

his time visiting the various provinces of the Empire. He traveled into Asia and Africa and lived in Athens for three years. In 131 he promulgated a fixed code of laws, which formed an important epoch in the development of Roman law. In 132 the Jews revolted, and for four years they carried on a bloody war, the only notable one of his reign.

Hadrian's Tomb, an enormous round tower, erected by Hadrian in Rome about 130 A. D. and completed by Hadrian's successor. In the Middle Ages it was used as a fortress and prison, and material changes have been made from time to time. Tradition says that Beatrice Cenci, Cagliostro and Buenvenuto Cellini were confined in it. At present it is called the Castello Saint Angelo, and though it is still imposing, it has lost much of its grandeur.

Hadrian's Villa, a large group of beautiful buildings erected near Tivoli, sixteen miles from Rome, by the emperor Hadrian and intended to illustrate the various scenes and buildings which he visited. The villa was ten miles in circumference and contained gardens, theaters, baths, colonnades, terraces, libraries, temples and a stadium. It was adorned with beautiful statues and works of art, in close imitation of Greek models. The ruins have furnished important works of art, now found in the various museums of Rome.

Haeckel, *hek'l*, ERNST (1834-), a German naturalist, born at Potsdam. He studied medicine and science at Berlin, Wurzburg and Vienna. After traveling in Norway and Italy, he became professor of zoölogy at Jena in 1865. He became the most prominent exponent of the Darwinian theories in Germany. Among his works are *The History of Creation*, *Anthropology*, *History of the Evolution of Man*, *Collected Popular Discourses on the Development Theory and Origin and Development of Animal Tissues*.

Haemoglobin, *hem o glo'bin* or *he mo glo'bin* (haemoglobulin), a substance found in the red corpuscles of the blood, which has the property of absorbing oxygen from the air and of giving it up to the tissues of the body. It gives color to the blood. The hematin in haemoglobulin contains iron. See BLOOD.

Hafiz, *hak'fiz* (?-about 1389), a celebrated Persian writer, one of the most famous lyric poets of all time. His verses have remarkable delicacy and melody and are chiefly upon themes of springtime, love and pleasure.

Hagenbeck, *hak'gen bek*, KARL (1844-), a German animal trainer, born at Hamburg,

where his father was a trader in animals. He inherited this business and greatly extended it. He traveled throughout Europe and in 1886 first visited the United States. At the World's Columbian Exposition in 1893 he exhibited more than one thousand animals, including rare wild species, and made several later tours through both America and Europe.

Ha'gerstown, Md., the county-seat of Washington co., 87 mi. n. w. of Baltimore, on the Baltimore & Ohio, the Norfolk & Western and other railroads. The city has good shipping facilities and is an important commercial center for the western part of the state. The industries include machine shops, knitting mills and the manufacture of pipe organs, furniture, agricultural implements and other articles. The place was settled about 1740 and was an important base of operations during the Civil War. Population in 1900, 13,591.

Hagfish, the name of the eel-like fishes, allied to the lampreys, that live as parasites upon fishes. They are of worm-like form and have no eyes or scales. The mouth is formed for suction, is without lips and is furnished with barbels. There is a single median fang upon the palate, by means of which the hag makes its way into the interior of other fishes, such as the cod, halibut and flounder. The skeleton is composed entirely of cartilage. The body is covered with a leathery skin that secretes a sticky fluid. An American species is common in rivers of New York and New England.

Haggai, *hag'ga i*, the tenth, in order, of the minor prophets, and the first of those who prophesied after the captivity. The book of Haggai consists of four distinct prophetic addresses, two in the first and two in the second chapter, intended to arouse his disheartened countrymen to the rebuilding of the Temple. They were delivered in 520 B. C. and are written in a brief and meager style. The closing prediction foreshadows the establishment of Christ's kingdom upon the overthrow of the thrones of the nations.

Hag'gard, HENRY RIDER (1856-), an English novelist, born at Norfolk and educated at Ipswich Grammar School. He traveled widely and was admitted to the bar, but finally devoted himself almost exclusively to literary pursuits. His most popular novels are *King Solomon's Mines* and *She*, while among the others may be mentioned *Jess*, *Allan Quartermain*, *Montezuma's Daughter* and *The Return*

of *She*. His works are of no artistic value, but hold the attention by their weird scenes and incidents.

Hague, hayg, The, the capital of the Netherlands, is situated in the province of South Holland, 33 mi. s. w. of Amsterdam and within 3 mi. of the North Sea. The city is beautifully laid out and is characterized by broad, regular streets, which are frequently intersected by canals and bordered with rows of trees. The finest buildings are in the northern section of the city. Among them are the government buildings, the town hall, the Groote Kerk, or Saint James Church, the palace of justice and the Binnenhof. Among the celebrated institutions of the city, the royal art gallery, containing a rich collection of Dutch art, including a number of masterpieces by Rembrandt, ranks first. The royal library contains 500,000 volumes and a large collection of coins and medals, and the municipal museum contains a large collection of paintings. The leading educational institutions include a gymnasium, the royal school of music, a drawing school and an educational institute conducted by the Free Masons. The Hague is also the home of many learned societies.

The prosperity of the city depends almost entirely upon its being the capital of the country. Its industries and trade are comparatively small, the leading manufactures including the manufacture of iron, ordnance, gold and silver ware, hats and furniture. The city was originally the hunting center of the counts of Holland. In 1250 it became a princely residence and in the sixteenth century was the seat of the States-General. From this it became the capital of Holland. The Hague has held an important position among European capitals, since it has been a sort of diplomatic center, and many important treaties have been negotiated there, including the Triple Alliance of England, France and Holland, and in 1899 it was the seat of the International Peace Conference, which established there a permanent court of arbitration (See PEACE CONFERENCE, INTERNATIONAL). Population in 1902, 218,029.

Hague. Peace Conference. See PEACE CONFERENCE, INTERNATIONAL.

Hahn'emann, SAMUEL CHRISTIAN (1755-1843), the founder of the homeopathic system of medicine, born at Meissen, Germany. He studied medicine at Leipzig, Vienna and Erlangen and took his degree at the last mentioned place in 1779. After practicing in various places,

he published in 1810 his great work, which fully explained his new system of curing any disorder by employing a medicine which produces a similar disorder. Hahnemann was driven from Saxony when the government prohibited him from dispensing medicines, but he found an asylum ultimately in Paris, where his system was authorized by the government and acquired popularity, which has steadily increased. Among his works notice is due to his *Dictionary of Materia Medica*, his essays on *Poisoning by Arsenic and Effects of Coffee* and his treatise on *Chronic Affections*. See HOMEOPATHY.

Haidarabad, hi dur a bahd'. See HYDERABAD.

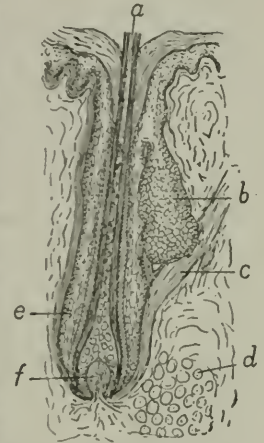
Hail, small masses of ice or frozen rain falling from the clouds in showers or storms. Hailstones vary in their form, being either angular, pyramidal or star-shaped. Sometimes they are as hard as ice and sometimes as soft as snow. At the center there is generally an opaque spongy mass, resembling sleet in its composition, and round this a semi-transparent frozen mass, consisting of a succession of layers of ice, is formed. Properly there are two kinds of hail, the small grains, which generally fall in winter and usually before snow, and the large hail, which occurs chiefly in spring and summer and is most severe in very hot climates. The small-grained hail is probably formed by the freezing of raindrops as they pass in falling through colder air than that from which they started. The large hail is probably due to the meeting of two currents of air, of very unequal temperature and electric tension. Hailstones are usually about one-fourth of an inch in diameter, but they are occasionally of much larger dimensions, being sometimes even three or four inches in diameter. In hot climates hailstones are very destructive to crops.

Hainan, hi nahn', an island of China, belonging to the Province of Kwang-tung, between the China Sea and the Gulf of Tonquin, separated from the mainland by a channel of fifteen miles, encumbered with shoals and coral reefs. The lowlands are fertile and produce timber, rice, sugar and cotton. The fisheries are also productive. The interior, which is mountainous and covered with forests, is inhabited by a distinct race, still in a very primitive stage. There are also many Chinese. The capital is Kiangchow, a large seaport on the northern coast. Population, estimated at 2,500,000.

Hair, the fine, thread-like, more or less elastic substance, of various form and color,

which forms the covering of the skin in mammals. It has the same use as feathers in birds and as scales in fishes and reptiles, and it varies from the finest wool to the quills of the porcupine and the bristles of the hog. The human body is naturally covered with long hair only on a few parts, yet nearly all parts produce a fine, short, colorless, sometimes hardly perceptible hair. The only places entirely free from it are the palms of the hands and the soles of the feet.

Each hair consists of a shaft—the part outside the skin, which does not grow—and a root, imbedded in the skin, which expands at its lower end into a swelling, or bulb, composed of little cells. It grows by forming new cells, which press the old ones forward to become part of the shaft. Each hair is said to live from two to four years. If the root is destroyed there is no means of reproducing the hair; but if the hair falls out, as is often the case after nervous fevers, it will grow again. The



SECTION THROUGH THE ROOT OF A HAIR

a, Shaft of the hair; b, sebaceous gland; c, muscle that raises the hair; d, fatty tissue; e, root sheath; f, vessels that nourish the hair.

color of the hair is due to pigment in the cells. Gray hair is caused by a deficiency of pigment. Baldness is caused by death of the papilla, or hair bulb, generally due to lessened circulation of the blood in the scalp. Connected with the bases of the hairs are small glands, called *sebaceous glands*, which secrete an oily substance that serves to keep the skin, as well as the hair, soft.

Hair, chiefly from the horse, the ox, the hog, the goat, especially the Angora or Mohair goat, the camel and the alpaca, is used for manufacturing purposes. That of the first three is used mostly for upholstery, the short hair being manufactured into curled hair for stuffing, and the long, straight hair being made into hair-cloth for seating. The long hair is also used for making fishing lines and brushes. White hair, because it can be easily colored, is used in the manufacture of fancy articles. The horse hair for weaving comes from Russia, Germany, Belgium, South America and Australia. Russia

also furnishes the bristles so largely used for brushes. The finer brushes, or hair pencils, of painters are made from the hair of the sable and the marten. The hair of the goat, the camel and the alpaca is chiefly used in combination with wool and other fibers for spinning and weaving into dress fabrics. Wigs, curls and beards are made from human hair, which comes largely from France, Germany and Italy, where the peasant girls sell their hair to dealers. In every case and for any purpose hair taken from the living subject is best.

Hair Dressing. From the earliest times the care of the hair has been an important part of the toilet. The ancient Assyrians, Babylonians, Persians and Egyptians curled the hair and beard with the utmost care and even wore wigs and false beards. The Hebrews gave much attention to the hair and considered a bald head a disgrace. The Greeks considered abundant hair one of the greatest marks of beauty, and Homer counts it among the gifts of Aphrodite. The various styles of hair dressing which obtained among the Greeks in very ancient times are shown in statues, and some of them were very elaborate, both for men and for women, but by the fifth century B. C. the men began to wear their hair more simply, either cut very short or left in its natural curls, while the women developed more elaborate styles. The custom of wearing false hair was brought from Asia to Greece and was for a time very popular. Until about 300 B. C. the Romans wore their hair long. Even at the time of Cicero this custom still prevailed to a certain extent, although the warriors and artisans of the period wore their hair short. In early times the Roman women wore their hair either flowing over the shoulders or gathered into a simple knot, but from the time of Augustus Caesar the fashions became more and more elaborate.

During the greater part of the Middle Ages the hair was worn very simply, but by the fourteenth century most elaborate coiffures began to appear. The men during the fifteenth and sixteenth centuries wore their hair rolled back from the forehead in a fashion similar to the later pompadour style for women, and their beards were tightly curled and gummed so as to stand out like a fan. For women, about this time, a fashion was prevalent of wearing a broad cushion, or coronet, resting on a great mass of curled or crimped hair. Louis XIV of France had very long and abundant hair, and the desire of his courtiers to imitate him brought

Hair Dyes

about the introduction of long curled wigs. The custom of wearing wigs was general for about a century after 1650, and no attention therefore was paid to hair dressing for men. From about 1640 to 1670 women wore their hair curled and falling over the shoulders and covered with a veil of gauze. Toward the close of the seventeenth century, however, more elaborate fashions returned, and tall headdresses of lace and starched cambric were used. Under Louis XVI of France, hair dressing reached a point of elaboration which has been approached at no other period. The women built their hair into a sort of tower, which they stiffened with wire or haircloth and upon which they wore a little cap or hat. There is a record of one style in which this hat was replaced by a model of a ship of war.

By the beginning of the nineteenth century, elaborate hair dressing for men had entirely gone out of fashion, and in most countries the hair was worn short. In the early part of the century women dressed the hair very simply, letting it fall at the sides in a series of ringlets and catching it at the back of the head with a ribbon. This was gradually superseded by an arrangement of the hair at the top of the head. During this period the hair was often arranged over a large roll, in a style known as the *chignon*, or waterfall. The tendency during the last half century among civilized people has been toward simplicity in hair dressing.

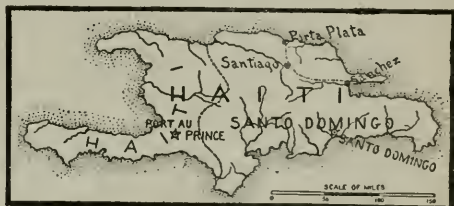
Hair Dyes, substances for giving hair some particular color. The numerous preparations sold for this purpose have generally a basis of lead or nitrate of silver. Bismuth, pyrogallie acid, sulphur, the juice of green walnut shells and other astringent vegetable juices are also employed. Hydrogen peroxide will bleach the hair. The use of dye is more or less injurious.

Hairless Dog. There are a number of different species of dogs whose bodies are entirely naked or have only here and there scattered hairs, or, perhaps, little tufts on the ears or tails. The Mexican hairless dog is the one most commonly seen in the United States. This resembles the common rat terrier in size and shape, but has a skin of bronze-purple color, with only here and there a few hairs. Other species of hairless dogs are found in the Oriental countries, in the Philippine Islands, the Bahamas and elsewhere. In ancient Mexico a breed of hairless dogs was raised for their young, which were considered delicate food.

Haiti

Hair Worm, the common name for a number of slender worms which resemble hairs. They are found as internal parasites of beetles and other insects during the first stages of their development. When mature, they escape and seek the water of pools, in which their eggs are deposited in the form of lengthened chains. The embryos produced from these eggs are able to hook themselves upon insects, which they enter and again become mature worms. It was formerly thought that horsehair put into water would turn into worms. See *TRICHINA*.

Haiti or **Hayti**, *ha'te*, one of the West Indies, after Cuba the largest of these islands. It lies southeast of Cuba and is separated from it by the Windward Passage, which is 50 miles broad. The island is 400 miles long and from 60 to 150



miles broad, and it is composed of the two republics, Haiti in the west and Santo Domingo in the east. The total area is about 28,250 square miles, about that of the State of Maine. Most of the island is very mountainous, the Cibao being the principal range, and Loma Tina, 13,300 feet high, the highest point. Among the rivers which have their source in the Cibao range are the Artibonite, the Yaqui del Norte, the Juna and the San Juan. The soil is very fertile, and a great part of the island has dense forests of mahogany, cedar and logwood. Silver, tin, platinum and iron are found to some extent in the island.

Haiti was discovered by Columbus in 1492, and the first permanent colony established by the Europeans in the western hemisphere was planted on the coast, the town of Santo Domingo being founded in 1496. For a long time the island belonged to Spain, but in 1600 the French began to settle here, and in 1697, by the Treaty of Ryswick, the western part was ceded to France. Most of the inhabitants were slaves, and in 1791 a fierce insurrection of the negroes broke out. They were led by Toussaint L'Ouverture, who established an independent republic and ultimately ruled as dictator over the whole island. In 1802 Bonaparte waged war against him, and he was seized and taken to France. The

Hajj

next year the negroes rose and drove out the French. After the brief rule of Dessalines the Spaniards regained the eastern portion of the island. Most of the history of both the Republics has been marked by revolutions and insurrections. Among the principal towns in Haiti are Port-au-Prince, Santo Domingo, Cape Haytien and Jacmel. Population of the Republic of Haiti, 1,374,000; that of the Republic of Santo Domingo, estimated at 610,000. See SANTO DOMINGO.

Hajj. See HADJ.

Hakluyt, *hak'loot*, RICHARD (about 1552-1616), an English geographer and historian. He graduated at Oxford and remained at the institution as lecturer upon his chosen subjects. In 1582 he published *Divers Voyages Touching the Discovery of America*, and within the next few years he wrote supplementary works upon the same subject, the most famous being *The Principal Navigations, Voyages and Discoveries of the English Nation*. This work had great vogue and was consulted by all the mariners of the time. He was influential in furthering the colonization of America and was a stockholder in the London Company, which settled Virginia.

Hakodadi, *hak'ko dah'de*, or **Hakodate**, *hak'ko dah'ta*, a city of Japan, near the south end of the island of Yezo. It lies at the foot of a hill on the shore of a beautiful and spacious bay, which forms one of the best harbors in the world. Hakodadi is one of the ports opened to British commerce through Lord Elgin's treaty with the Japanese government in 1858. Population, 78,040.

Halberd, *hol'burd*, or **Halbert**, an offensive weapon, consisting of a pole or shaft about 6 feet long, with a head armed with a steel point edged on both sides. Near the head was a cross piece of steel, somewhat in the form of an axe, with a spike or hook at the back. It was much used in the English army in the sixteenth century and gave its name to troops called *halberdiers*, to whom was confided the defense of the colors and other special duties. It is now used only on ceremonial occasions.

Halcyon, *hal'se on*, an old or poetical name of the kingfisher. It was said in fable to lay its eggs in nests that floated on the sea and to have the power of charming the winds and waves during the period of incubation, so that the weather was then calm. From this superstition comes our term *halcyon days*.

Hale, EDWARD EVERETT (1823-1909), a Unitarian clergyman, philanthropist and author,

Hale

son of Nathan Hale, a journalist, was born at Boston, Mass. His early education was received at the Boston Latin School. He graduated from Harvard University in 1839 and settled as pastor of a Unitarian church at Worcester, Mass., in 1846. Ten years later he returned to Boston and took charge of the South Unitarian church and remained its active pastor forty-five years. Mr. Hale's interest in all reforms and progressive movements had a great and beneficial influence. He founded and for a long time edited the *Christian Examiner*, a Unitarian weekly, and



EDWARD EVERETT HALE

The Old and the New, which in 1875 was merged with *Scribner's Monthly*. He became widely known as a brilliant lecturer and able writer, and has been called "The American Defoe," because he gives his romances such a striking appearance of reality. This is well illustrated in *The Man without a Country*, which was widely read during the Civil War. Of his later writings the most important are *Philip Nolan's Friends*, *The Story of Massachusetts*, *A New England Boyhood*, *Lowell and His Friends*, *Memoirs of a Hundred Years* and *Ten Times One is Ten*. The last led to the founding of such charitable clubs as King's Daughters, Lend-a-Hand and others. He has also written and edited many important historical works. He was chosen chaplain of the United States Senate in 1903.

Hale, EUGENE (1836-), an American politician, born in Oxford County, Maine. He

received only an elementary education, was admitted to the bar in 1857 and became county attorney of Hancock County; later he was member of the legislature, and from 1869 to 1879 he was a member of Congress as a Republican. He was offered cabinet portfolios by Grant and Hayes, but declined, and was elected in 1881 to the United States Senate, where he served continuously for more than twenty-five years.

Hale, JOHN PARKER (1806-1873), an American statesman, born in Rochester, N. H. He was educated at Phillips Exeter and at Bowdoin College and was admitted to the bar in 1830. As a strong Jacksonian Democrat he was elected to the state legislature and from 1834 to 1841 was United States district attorney. Elected to Congress in 1842, he became prominent in his opposition to slavery, contrary to the wishes of his constituents. In 1845 he undertook a great antislavery campaign in his state and achieved remarkable success, being chosen United States senator in 1846. He opposed the Mexican War and refused to vote for a resolution of thanks to general Scott and Taylor. In 1852 he was nominated for the presidency by the Free-Soil party and polled 157,685 votes. He retired from the Senate in 1853, but was reelected in 1855, serving until 1865, as a vigorous supporter of President Lincoln.

Hale, MATTHEW, Sir (1609-1676), an English jurist, born at Alderley, Gloucestershire. He graduated at Oxford and began the study of law, devoting time, besides, to investigations in history, mathematics, science, theology and philosophy. He was admitted to the bar in 1637 and soon gained a large practice. He remained neutral in the struggle between Parliament and the king until Parliament had gained supremacy, and then he held positions of honor under the Commonwealth and the Protectorate. He was instrumental in securing the restoration of Charles II and was knighted by him and made chief baron of the exchequer. Somewhat later he became chief justice. Hale's writings upon English law have always been consulted as the very highest authority and have been the basis of many later treatises, notably Blackstone's *Commentaries*.

Hale, NATHAN (1755-1776), an American soldier and hero, born at Coventry, Conn. In 1773 he graduated at Yale, and he taught school in East Haddam and New London, Conn., until the outbreak of the Revolutionary War. He enlisted as a volunteer, became a lieutenant in Colonel Webb's regiment and was assigned recruiting duty in New York. On Washington's

call for a volunteer to enter the British lines and procure intelligence, he responded. Disguised as a Dutch schoolmaster, he visited all the enemy's camps in New York and Long Island, made drawings of the works and obtained all the information required. He was about to return when he was arrested as a spy, tried and condemned to be hanged. The execution took place in New York City. His last words were, "I only regret that I have but one life to lose for my country." Statues have been erected to him in Hartford, Conn., and in City Hall Park, New York.

Halevy, ah la ve', JACQUES FRANÇOIS FROMENTAL (1799-1862), a French musical composer, born of Jewish parentage at Paris. His masterpiece, *La Juive*, appeared in 1835 and rapidly obtained wide fame in Europe. Among his other works are *L'Eclair*, *Guido et Ginevra*, *La Reine de Chypre* and *La Fée aux Roses*, all of which disclose deep feeling.

Halevy, LUDOVIC (1834-), a French novelist and dramatist, born in Paris. He first achieved fame as the author of the librettos for Offenbach's light operas, including *La Belle Héloïse* and *La Barbe Bleue*. He soon began the construction of farces, and in 1869 he produced his first serious drama, *Frou-Frou*, one of the most important dramas of the century. Of his novels, the most widely known are probably *L'Abbe Constantin*, *Criquette* and three remarkably interesting stories dealing with the Cardinal family. He was elected to the French Academy in 1884, was previously made chevalier of the Legion of Honor and became commander in 1900.

Half-tone, a process of making, from photographs and engravings, plates which resemble electrotypes. The process of making halftones is somewhat complicated. Engravings, photographs and drawings can be reproduced by this method, but photographs give the best results, and for this reason are the most generally used. The first step in the process consists in making a negative of the picture, in a camera containing a screen specially prepared for the process. This screen consists of two glass plates, ruled with parallel lines, which are very near together. The lines cross the plates diagonally and are so drawn that when the two plates are placed together they form diamond-shaped checks. These plates are cemented together with Canada balsam and placed in the camera near the plate upon which the negative is made. It is by means of these screens that the dots which give the shadow

Haliburton

effect in the halftone are produced. The dots covering the portion of the picture which has the high lights are lighter and larger than those covering the portions in shadow, so that the lights and shadows in the picture are exactly reproduced in the negative.

After the negative has been developed, it is carefully removed from the plate and laid face downward upon the sensitized copper plate upon which the halftone is to be made. The copper plate is prepared by planing and polishing; it is then covered with a thin film of sensitized material, upon which the photograph is made. This material hardens under the action of light; and if the plate and the negative be exposed to an electric light for a few moments and the sensitized plate be "developed" in certain chemicals, a reproduction of the picture is left upon the copper. By washing, those portions of the sensitive film which were not acted upon by the light are dissolved away, leaving the others to protect the surface of the copper. The plate is then placed in an acid bath and etched (See ETCHING), after which it is cleaned and is then ready for printing.

The fineness of the halftone depends upon the number of lines on the screen. For halftones of the best grade from 150 to 200 lines to the inch are used. Poorer grades contain coarser screens, and in these the checks are plainly seen. Halftone plates are comparatively cheap and produce good pictures. For these reasons they are very generally used in the illustration of books and periodicals. See PHOTOGRAPHY.

Hal'iburton, THOMAS CHANDLER (1796-1865), a British-American humorist, whose pen name was Sam Slick. He was born at Windsor, Nova Scotia, and was educated in Canada, where he became a judge of the supreme court. In 1856 he removed to England, and three years later he became a member of Parliament. His fame rests on his *Sam Slick*, in which he pictures a Yankee clockmaker, whose shrewd sayings and knowledge of human nature won immediate popularity. A later series, in which Sam Slick appears as an attaché of the United States legation in England, gave Haliburton the opportunity for much humorous comment on British customs. His other works include *Wise Saws and Modern Instances*, *Nature and Human Nature*, *Bubbles of Canada* and *An Historical and Statistical Account of Nova Scotia*.

Hal'ibut, one of the largest of the flatfish family, sometimes weighing more than 300 pounds. The fish has a compressed body, one

Hall

side resembling the back and another the belly, and both eyes are on the same side of the head.



HALIBUT

The halibut is caught on both sides of the Atlantic and is much prized as food. See FLOUNDER.

Hal'ifax, a manufacturing town of England, in the County of York, West Riding, 14 mi. e. s. e. of Leeds, on the Calder River. The principal buildings are the Piece Hall, the parish church, All Souls' Church, a fine townhall and several museums and hospitals. There are also several parks, libraries, picture galleries, a Blue Coat School and an Observatory. The chief manufacture of Halifax is woolen goods, and the city also produces carpets and other textile goods. Population in 1901, 104,936.

Halifax, a city, the capital of Nova Scotia, situated on the slope of a commanding hill, on the western side of Halifax harbor. Among the buildings are the Dominion Building, the Government House, the Roman Catholic Cathedral, Saint Paul's Church and Dalhousie College. The harbor is one of the best in the world. It is the principal naval station of British America, has an extensive foreign and coasting trade and exports large quantities of fish, lumber and coal. The city contains a large royal dockyard, 610 feet in length. There are considerable manufactures, embracing iron castings, machinery, nails, soap, leather, tobacco and paper. Halifax has extensive steamship communication with Canada, United States, Great Britain and the West Indies. Population in 1901, 40,787.

Halifax, CHARLES MONTAGUE, Earl of (1661-1715), an English statesman and poet. It was at his suggestion that the national debt was established as a means for raising funds, and the Bank of England was founded through his instrumentality. Halifax was twice impeached, but the impeachment was never carried through. His poem on the death of Charles II and a parody on Dryden's *Hind and Panther*, called *The Town and Country Mouse*, attracted considerable notice in their time.

Hall, in architecture, a large room or apartment; in modern usage, the room into which others open or which connects two or more

apartments. Halls in the original sense formed the subject of closest study by architects of medieval times, and many of them, occupying whole buildings, were of the greatest beauty. In the later Middle Ages so-called guildhalls were constructed and served as market places in commercial centers. Many of them are still standing, among which the most interesting are the Butchers' Hall at Ghent, the Bakers' Hall at Brussels, the Cloth Hall at Ghent and the Bankers' Hall at Antwerp.

Hall, ASAPH (1829-1907), an American astronomer, born in Goshen, Conn., and educated in Central College, New York, and at the University of Michigan. In 1862 he became an assistant in the naval observatory at Washington, and in the following year was made professor of mathematics in the same institution; but in 1891 he left the government service with the rank of captain. Hall was sent with various scientific expeditions undertaken by the government, amongst which were those to Bering Strait in 1869, to Colorado in 1878 and to Vladivostok, Siberia, in 1874, to observe the transit of Venus. The greatest of his numerous discoveries was that of the moons of Mars, and his most important work was a study of the double stars. For six years he was professor of astronomy at Harvard, and in 1902 he was made president of the American Association for the Advancement of Science.

Hall, CHARLES FRANCIS (1821-1871), an American Arctic explorer, born at Rochester, N. H. He began life as a blacksmith, later became a journalist in Cincinnati and in 1860 organized an Arctic expedition in search of Franklin. He remained among the Eskimos for two years, and in 1864 he undertook a second expedition to the same regions, where he remained until 1869. In 1871, at the instigation of Hall, the United States government fitted out the *Polaris*, for an expedition to the North Pole, and placed Captain Hall in command. The *Polaris* sailed from New York, June 29, 1871, and reached latitude 82° 11' north, the farthest point reached up to that time, and then turned back to winter in a sheltered bay, where Hall died on November 8. The *Polaris* was ultimately abandoned by her crew, who reached home only after experiencing many privations and adventures. See NORTH POLAR EXPLORATION.

Hall, GRANVILLE STANLEY (1845-), an American educator and psychologist, educated at Williams College and in Germany. He held successively the positions of professor of psychology in Antioch College, lecturer on psy-

chology at Harvard and Williams, professor of psychology in Johns Hopkins University and president of Clark University, Worcester, Mass. Doctor Hall is recognized throughout the country as an eminent authority upon education and has been one of the leaders in adapting methods of instruction to the new psychology. He is also an authority on, and one of the leaders in, the movement of child study in this country. He is the author of *Methods of Teaching History*, *How to Teach Reading*, *Contents of Children's Minds* and *Adolescence*, an elaborate work touching on the relation of adolescence to education. He is also a frequent contributor to educational periodicals.

Hallam, HENRY (1777-1859), an English historian. He was educated at Eton and Oxford and studied for the law, but abandoned it for literary pursuits. His contributions to the *Edinburgh Review* brought him into notice, and his *View of the State of Europe during the Middle Ages*, which appeared in 1818, at once established his reputation. His next work, the *Constitutional History of England from the Accession of Henry VII to the Death of George II*, showed, like the first, the solid learning, patient research, accuracy and impartiality of statement which are characteristic of Mr. Hallam's work. In 1837-1839 appeared his last great work, the *Introduction to the Literature of Europe in the Fifteenth, Sixteenth and Seventeenth Centuries*, a useful survey of literary history, though wanting in the fineness of judgment necessary for such work. His youngest son, Arthur Henry, a youth of high promise, who died suddenly at the age of twenty-two, is the subject of Tennyson's *In Memoriam*.

Halle, *hahl'le*, usually called *Halle an der Saale* (Halle on the Saale), to distinguish it from other places of the same name, an important German town in the Prussian province of Saxony, about 20 mi. n. w. of Leipzig, on the river Saale. The university, with which that of Wittenberg was incorporated in 1817, is a celebrated institution, founded in 1694 and attended by 2000 students. Halle has an extensive trade, and manufactures chemicals, oil, malt, dyes, agricultural machines and salt, which it mines on an island in the Saale. Population in 1900, 156,611.

Halle, UNIVERSITY OF, a German university, founded by the Lutheran Church in 1694. It was established as the educational center of the Lutherans in Germany, and from the start it had a large number of students. It was begun as a theological school and has ever since been

one of the leading institutions of this class in Germany. In 1817 the University of Wittenberg was united with it. The school is very prosperous, maintains the usual departments of literature, theology and science and gives special attention to instruction in agriculture. The number of students is usually about 2000, and the library contains over 210,000 volumes.

Hal'leck, FITZ-GREENE (1790-1867), an American poet. He became a clerk in a New York banking house and for years was in the employment of John Jacob Astor. In 1819, poems by him and his friend Drake appeared in the *New York Evening Post*, under the signature of Croaker & Co., and attracted some attention. It was on the death of Drake that Halleck wrote his most beautiful poem, beginning "Green be the turf above thee." In 1820 he published *Fanny*, his longest poem, a satire on the follies and fashions of the day. Among his best poems are *Marco Bozzaris*, *To the Memory of Burns*, *Alnwick Castle* and *Red Jacket*.

Halleck, HENRY WAGER (1815-1872), an American general, born in Westerville, N. Y., and educated at West Point. In 1846 he published *Elements of Military Art and Science*, and he was raised to the rank of captain for his services in the Mexican War. In 1854 he left the army and settled in San Francisco as a lawyer and director of a mining company. On the outbreak of the Civil War, in 1861, he was created major general in the United States army, and after the victories at Paducah and Fort Henry and Fort Donelson and the capture of Corinth, he became, in 1862, commander in chief, a position which he held till superseded by General Grant in 1864. Ultimately he received the command of the South Division, at Louisville.

Hallelujah, **Alleluia** or **Halleluia**, *hal'le-loo'yah* (praise ye the Lord), a Hebrew formula of praise, often occurring in the *Psalms*. It is retained in the translations of the various Christian churches, probably on account of its full and fine sound, so proper for public religious services. The *Great Hallelujah* is the name given by the Jews to *Psalms* 113-117, which are sung on the feasts of the Passover and Tabernacles. The great "Hallelujah Chorus" in Handel's oratorio *Messiah* is considered one of the most magnificent pieces of choral music ever written.

Haller, *hahl'tur*, ALBRECHT VON (1708-1777), a famous Swiss scientist and poet. He was a practicing physician and professor of anatomy, a botanist of great fame and one of the leaders in the modern school of German poetry.

Many years of his life were spent entirely in original investigation, and the result of his work has been published in numerous volumes. At one time he resided in England as the physician to the king, an appointment he received in 1739.

Hal'ley, EDMUND (1656-1742), an English astronomer and mathematician, born in London and educated at Saint Paul's School and at Queen's College, Oxford. He traveled extensively and made observations on important celestial phenomena, making a catalogue of the stars of the southern hemisphere. Newton's calculations of a comet's orbit were based partly on Halley's observations. Halley had charge of a voyage in the Pacific for the observation of the stars and was so successful that he was made a captain in the navy with half pay for life. In 1703 he became a professor of geometry at Oxford and ten years later became secretary of the Royal Society, which position he held until his death, devoting most of his time and study to the observation of the motions of the moon. A great many important discoveries are accredited to Halley, who is remembered as the first one to predict the return of a comet.

Hall of Fame, a building on the grounds of the New York University, erected as a memorial to famous Americans and completed in 1900. It consists of a colonnade 400 feet long, with provisions for 150 panels, two feet by six, each to bear the name of a famous American. Only persons who have been dead ten years or more and were born in territory of the United States were originally eligible. Fifty names were to be inscribed at the beginning, and five additional names were to be added every fifth year until the year 2000, when the 150 inscriptions will be completed. The nominations of the public were invited, and these, on being seconded by the senate of the University, were submitted to a board of one hundred judges, eminent citizens chosen by the council. The rule requires that no one who receives less than fifty-one votes can be accepted. In 1900, of the 252 names submitted, twenty-nine received the required number of votes; the following were chosen: George Washington, Abraham Lincoln, Daniel Webster, Benjamin Franklin, Ulysses S. Grant, John Marshall, Thomas Jefferson, Ralph W. Emerson, Henry W. Longfellow, Robert Fulton, Washington Irving, Jonathan Edwards, Samuel F. B. Morse, David G. Farragut, Henry Clay, Nathaniel Hawthorne, George Peabody, Robert E. Lee, Peter Cooper, Eli Whitney, John Audubon, Horace Mann, Henry Ward Beecher,

James Kent, Joseph Story, John Adams, William E. Channing, Gilbert Stuart, Asa Gray. In 1904 it was decided that additions should be made to the original hall of a small hall for foreign-born Americans and of a hall for women. In 1905 the following were added: John Q. Adams, James R. Lowell, William T. Sherman, James Madison, John G. Whittier, Alexander Hamilton, Louis Agassiz, John Paul Jones, Mary Lyon, Emma Willard and Marie Mitchell.

Hal'low-e'ven or **Hallowe'en'**, the evening of October 31, so called as being the eve or vigil of All Hallows, or All Saints, which falls on November 1. It is associated in the popular imagination with various superstitions and is frequently celebrated by young people with various tricks, games and rites, in many of which the element of prophecy is supposed to play a conspicuous part. Other games, which have no superstitious significance, such as ducking for apples in a basin of water, are also associated with hallowe'en.

Hallucination, *hal lu'se na'shun*, a condition of mind in which a person thinks he sees or hears things that have no existence. The mind acts without a sensation to produce the action. Hallucinations are to be distinguished from delusions, for in the latter there are real sensations, which are erroneously interpreted. All the senses are not equally subject to hallucinations. Hearing is most frequently affected, and then sight, smell, taste and touch, in order. Hallucinations of several senses may exist simultaneously in the same individual, and these may be complicated with certain delusions. The simplest form of hallucination of hearing is the ringing in the ears; but the striking of clocks, the sounds of musical instruments and of the human voice are often heard. Hallucinations are not confined to those whose mental faculties are disordered. Occasionally they appear in healthy persons, and the individual is fully conscious of the unreality of the objects that affect his senses. Sometimes after long periods of intense mental work, troublesome hallucinations may appear, but rest will drive them away.

Halmahera, *hahl'ma ha'rah*. See GILOLO.

Ha'lo, the name given to colored circles of light sometimes seen around the sun or moon, and to other similar luminous appearances. These phenomena are classified as (1) *halos proper*, consisting of complicated arrangements of arcs and circles of light surrounding the sun or moon, accompanied by others tangent to or intersecting them; (2) *coronas*, simple rings,

generally somewhat colored; (3) *aureolas*, bright rings surrounding shadows projected upon a cloud or fog-bank, or the colored rings observed by aeronauts on the upper surface of clouds. All these appearances are the result of certain modifications which light undergoes by reflection, refraction, dispersion, diffraction and interference, when it falls upon the crystals of ice, the raindrops or the minute particles that constitute clouds.

Halogen, *hal'o jen*, (sea salt producer), a name given to a family of four elements, because they closely resemble the sea salt and the salts of sodium. All strongly resemble one another and form colorless hydrogen compounds which fume strongly in the air. The typical member is fluorine, which, however, has many characteristics not possessed by the other members of the family. See FLUORINE; CHLORINE; BROMINE; IODINE.

Hals, *hahls*, FRANS (about 1584-1666), a Dutch painter, probably second only to Rembrandt. He was born at Antwerp, but soon went to Haarlem and studied under eminent teachers. He is especially famous as a portrait painter, among the most famous of his paintings being *The Banquet of the Officers of the Arquebusiers of Saint George*, in which he displays the remarkable feeling for artistic groups and high coloring which distinguished all his works. Others are *The Officers of Saint Andrew*, *The Shooting Gallery*, *The Governors of the Elizabeth Hospital*, *The Artist and His Wife in the Park* and *Nurse with Child*. Hals was also distinguished as a *genre* painter, among his works being *The Jolly Trio*, *The Herring Vender* and *The Fool Playing a Lute*.

Hal'stead, MURAT (1829-1908), an American journalist, born in Butler County, Ohio. Beginning as local reporter on the Cincinnati *Commercial* in 1853, he became some years later its chief owner. In 1883 the *Commercial* and *Gazette* of Cincinnati were consolidated. Later he was editor of the Brooklyn *Standard-Union*, and, finally, he won fame as special correspondent of American papers during the Spanish-American War. Mr. Halstead exercised powerful influence in the councils of the Republican party in Ohio.

Ham, according to *Genesis* vi, 10, was one of the three sons of Noah. He was the ancestor of the people of Egypt, Babylonia and Canaan.

Ham, the name usually given to the cured thigh of the ox, sheep or hog, particularly the last. The curing of hams forms an important

part of the meat-packing industry. For ordinary trade they are first pickled in brine, then smoked in large chambers, built especially for the purpose. The smoking is done with hickory wood and powdered mahogany. Each nation has its own method of curing hams, and the packing houses try to conform to these customs for their export trade. Originally, ham meant the hind part or angle of the knee. See PORK; MEAT-PACKING.

Ham'adry'ad. See NYMPHS.

Hamburg, *hahm'boorK*, one of the free cities of Germany, a member of the German Empire and the greatest commercial port on the continent of Europe, is situated about 80 mi. from the North Sea in a low plain, along the north branch of the Elbe. Numerous beautiful suburbs surround the city. From the Elbe proceed canals which intersect the eastern and lower part of the city in all directions; the town is also intersected by the Alster, which here forms two fine basins, the Binnenalster and Aussenalster. The chief commercial street of Hamburg is the Jungfernstieg, while the center of the business of banking and exchange is the Neuerwall and Alterwall. Among the principal buildings are the Exchange, the Rathaus, the German Theater and the churches of Saint Nicholas and Saint Michael. The city owns its water plant, sewage disposal plant, bath-houses, gas, electric lighting and street railway plants (operated by private companies). It has many fine schools and hospitals, a public library of 600,000 volumes, an art gallery and a notable museum.

The quays and harbor accommodation are very extensive, and, with its geographical location, give to Hamburg its importance as a shipping center and as a center of banking, exchange and marine assurance, carried on in connection with commerce. Its imports in 1904 amounted to \$617,768,857. Its manufactures, though large, are less important, including shipbuilding, tobacco and cigar making, iron founding, brewing, coffee roasting, chocolate making and others. A great many emigrants embark here.

The State of Hamburg embraces a territory of 158 square miles and includes the City of Hamburg, with a population of 872,000, and fifteen rural districts and outlying towns and bailiwicks, with a population of about 75,000. The legislative power belongs to the house of burgesses, whose acts, except in matters of taxation and finance, are subject to the senate's veto. The executive power is vested chiefly in the senate, which is composed of eighteen

members, chosen for life, of whom nine must have studied law or finance, and of the other nine seven must belong to the commercial class. The senate chooses a first and second burgo-master (or mayor) from its own number. The house of burgesses consists of 160 members, half of whom are elected every three years by the votes of all tax-paying citizens, while the other half are chosen partly by a much restricted franchise and partly by guilds and corporations.

Hamburg was founded by Charlemagne about 806. It initiated the Hanseatic League with Lübeck and Bremen in 1249 and rapidly grew until 1810, when it became a part of France and suffered under Napoleon's Continental System. In 1815 it entered the German Confederation and in 1871 became a part of the Empire, where it is represented in the Diet by three deputies.

Ham'erton, PHILIP GILBERT (1834-1894), an English etcher, painter and writer on art. His most important works include *A Painter's Camp in the Highlands and Thoughts about Art, Etching and Etchers* and *Painting in France After the Decline of Classicism*. From 1869 until his death, he was editor of the *Portfolio*, an art magazine which he founded.

Hamil'car Barca, *bahr'kah*, a great Carthaginian general, the father of Hannibal. While still a young man he was appointed to the command of the Carthaginian forces in Sicily, shortly before the close of the first Punic War, when the Romans were masters of almost the whole island. For several years he defied all the efforts of the Romans to dislodge him; but the defeat of the Carthaginian admiral, Hanno, compelled him to evacuate Sicily. A revolt of the returned troops, joined by the native Africans, was successfully repressed by Hamilcar. He then entered on a series of campaigns in Spain, where he founded a new empire for Carthage. He had brought the whole southern and eastern part of the country under Carthaginian rule when he was slain in a battle against the Vettones, 228 B. C. His great design of making Spain a point of attack against Rome was ably carried out by his son-in-law, Hasdrubal, and his son, Hannibal.

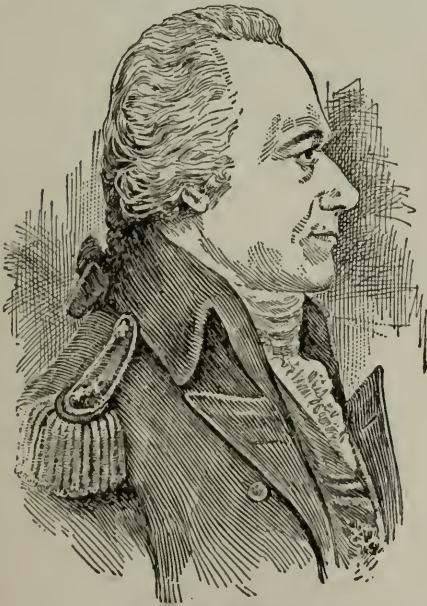
Ham'ilton, the capital of the Bermudas, on the coast of the largest island, near the middle of the group. It has a land-locked harbor. Population in 1901, 2246.

Hamilton, a city, the capital of Wentworth co., province of Ontario, Can., on Burlington Bay and Lake Ontario, 40 mi. s. w. of Toronto, on the Grand Trunk, the Canadian Pacific and

other railroads. It has various industries, including cotton mills, flour mills, an iron foundry, stone foundries, wire works, screen works, canning factories and rolling mills. It is in the center of a rich fruit region. A few miles east is the battlefield of Stony Creek, and on the west of the city is Burlington Heights, both famous in the War of 1812. Population in 1901, 52,634.

Hamilton, OHIO, the county-seat of Butler co., 25 mi. n. of Cincinnati, on the Great Miami River and the Miami & Erie Canal and on the Cincinnati, Hamilton & Dayton, the Pittsburgh, Cincinnati, Chicago & Saint Louis and other railroads. The industries include paper, flour and woolen mills, foundries, machine shops, breweries, and manufactories of tools, agricultural implements, safes and other articles. The surrounding country is agricultural, and there is a good trade in farm produce. General Arthur Saint Clair built a fort here in 1791 and called it Fort Hamilton, in honor of Alexander Hamilton. A settlement grew up around this and was first incorporated in 1810. Population in 1900, 23,914.

Hamilton, ALEXANDER (1757-1804), a distinguished American statesman, born in the



ALEXANDER HAMILTON

island of Nevis, West Indies. At the age of sixteen he became a student in Columbia College, New York, and early contributed some powerful letters to the discussion of pre-Revolu-

tionary issues. On the outbreak of the war he received (1776) a commission as captain of artillery and soon attracted the attention of Washington, who appointed him his aid-de-camp and employed him in the most delicate and difficult affairs. In 1781 he left the service, studied law, became a delegate to Congress from the State of New York in 1782 and in 1787 was a conspicuous member of the convention called to revise the Articles of Confederation. He was a strong supporter of centralized government and of the Constitution as completed, and by the letters which he wrote to the *Daily Advertiser* of New York, afterward published under the title of *The Federalist*, he exerted great influence in favor of its ratification, especially in New York.

On the organization of the government in 1789, with Washington at its head, Hamilton was appointed secretary of the treasury. In this office he displayed a remarkable grasp of financial and political problems, being responsible for the establishment of a national bank and a United States mint, for the organization of a capable treasury department, for the imposition of customs and excise duties and for the assumption by the nation of the Revolutionary debts of the states. He resigned in 1795 and retired into private life. In 1798 he was appointed second in command of the provisional army, in the fear of a French war, and on the death of Washington, in 1799, he became commander in chief. In 1804 he became involved in a political dispute with Aaron Burr, then candidate for the governorship of New York, accepted a challenge for a duel and was mortally wounded. Hamilton was undoubtedly one of the greatest figures in American history, being distinguished as soldier, author, debater, legislator, financier, lawyer and administrator.

Hamilton, GAIL. See DODGE, MARY ABIGAIL.

Hamilton, WILLIAM, Sir (1788-1856), a metaphysician, logician and philosopher, of the Scottish school. Having studied and gained distinction at Glasgow, in 1809 he entered Balliol College, Oxford, where he gained first-class honors. In 1829 the publication in the *Edinburgh Review* of his celebrated critique of Victor Cousin's system of philosophy gave him at once a first place among the philosophical writers of the time. He was appointed to the chair of logic and metaphysics in Edinburgh University in 1836. Hamilton's chief works are *Discussions on Philosophy and Literature* and *Lectures on Metaphysics and Logic*.

Hamites (descendants of Ham), the name given to a number of races in North Africa, who are regarded as of kindred origin and speak allied tongues. They include the ancient Egyptians and their modern descendants, Copts, Berbers, Tuaregs, Kabyles, Gallas, Falashas, Somali and Dankal.

Hamlet or **Am'leth**, a prince of Denmark who, according to tradition, lived about 200 B. C. Shakespeare's famous tragedy follows closely, in its main outline, the semi-legendary story of Hamlet, but varies in many of the details.

Hamlin, **HANNIBAL** (1809-1891), an American politician, vice-president of the United States, born in Maine. He learned printing, practiced law and served as a member of the legislature from 1835 to 1840. In 1842 he was elected to Congress and served until 1846, commanding attention as an anti-slavery man and, especially, as an advocate of the Wilmot Proviso (See **WILMOT PROVISIO**). In 1848 he became United States senator as a Democrat and was reelected in 1851, but joined the Republican party. He was elected governor of Maine in 1856. He returned to the Senate the following year, but was elected vice-president in 1860, was again chosen United States senator in 1869 and served until 1881, when he was appointed minister to Spain.

Hammer, a tool used for driving nails, beating metals and other similar purposes. The hammer has two parts, the head and the handle. Before metals were known stones were used for hammers. The indians made handles by cutting a groove around the stone and twisting a green branch of a tree or shrub around it so it would fit tightly into the groove. When dry the handle became stiff and the arrangement made a very good hammer. The common carpenter's hammer has a face and a claw. Between these is the eye for the handle. The face has usually a flat surface and is made of hard steel. In using the hammer it should be held firmly in the hand, which should grasp the end of the handle. In drawing nails, care needs to be taken so as not to bend the nail as it is drawn. This can be prevented by placing a little block under the hammer after the nail has been started. If the nail is long, a thicker block may be necessary before it has been completely drawn. Hammers of various shapes and styles are made for different kinds of work. See **STEAM HAMMER**; **TRIP HAMMER**.

Hammer, THROWING THE. See **ATHLETICS**.

Ham'merhead or **Hammerhead Shark**, a shark named because of its extraordinary head, which resembles a double-headed hammer, with eyes at the end of the projections. There are a number of species inhabiting warm seas, and one species is found on the coast of the United States. All species are savage and dangerous.

Hammock, a rectangular piece of cloth or netting, about six feet long and four feet wide, gathered together at the two ends and hung horizontally, forming a kind of bed, or place in which one may recline for pleasure. Hammocks are the common beds in use on board ships of war. The word is said to be of Caribbean origin.

Hammond, **IND.**, a city in Lake co., 21 mi. S. E. of Chicago, on the Grand Calumet River and on the Erie, the Baltimore & Ohio, the Michigan Central, the Wabash and several other railroads. It is in an agricultural region and has growing importance as a commercial and manufacturing center. The city contains a large distillery, meat-packing plants, brick-yards, tanneries, foundries, flour mills, chemical works and manufactories of steel springs, starch, glue, nails and other articles. Population in 1900, 12,376.

Hampden, **JOHN** (1594-1643), an English statesman, famous for his opposition to taxation by prerogative. He entered Parliament at the beginning of Charles I's reign and served in the first three Parliaments (1625, 1626, 1628).. Although he attracted some attention in 1627 by refusing to contribute to a forced loan, it was not until ten years later that his resistance to Charles's demand for ship-money brought him generally before the public. Although Hampden's contention was the reasonable one, that an inland county should not be forced to pay ship-money in time of peace, and although he himself argued his case ably, he was condemned. The popular opposition to the decision against Hampden greatly increased the hatred of Charles I and his arbitrary measures. Of the Short Parliament and the Long Parliament of 1640, Hampden was a member, and he was one of the five members whom the king in January, 1642, attempted to arrest. As commander of a regiment in the Parliamentary army, Hampden took part in a skirmish at Chalgrove Field in June, 1643, and was killed.

Hampton, **WADE** (1754-1835), an American soldier, born in South Carolina. He served in the Revolutionary War and was a member of the United States Congress from 1795 to 1797

Hampton

and from 1803 to 1805. He also took active part in the War of 1812, but failed to uphold his reputation as a soldier.

Hampton, WADE (1818-1902), an American soldier and politician, born at Columbia, S. C., and educated in law at the state university. He did not begin practice, however, but confined his attention to the management of his vast estate. Though a Democrat, Hampton favored the Union party until the secession of his state, when he joined in the movement for the Confederacy. He equipped a private command known as Hampton's Legion, which rendered valuable service to the Confederates throughout the war, especially at the first Battle of Bull Run and in the Peninsula Campaign. Hampton was commissioned brigadier general of cavalry, was with Lee in his second invasion, was wounded at Gettysburg and became a major general in the following August. He also opposed Sheridan in the Shenandoah Valley in 1864 and for his service in that campaign was made lieutenant general and commander of all the Confederate cavalry. Later he was with Johnston in opposing Sherman's northward march from Savannah. After the war he did his utmost to heal the wounds of the South and to foster loyalty to the reunited nation. He was elected governor of South Carolina in 1876 and two years later entered the United States Senate, where he served until 1891. Two years later he was appointed United States commissioner of railroads, serving until 1897.

Hampton Court Conference. Shortly after James I of England came to the throne, he granted to the Puritans a conference, with the hope that compromise and agreement might be arrived at. The Puritans presented a petition for certain reforms within the Church and for a relaxation of the strict laws in favor of the whole of the Prayer Book. James, however, angered by the use of the word *presbyter*, which reminded him of the Presbyterianism he had so hated in Scotland, gave an adverse decision, and the opposition of the Puritans to the House of Stuart began at this time.

Hampton Normal and Agricultural Institute, an institution for the education of negroes and indians, established at Hampton, Va., in 1868, under the auspices of the American Missionary Society and through the inspiration of General S. C. Armstrong, who was its first superintendent. The school is located on a farm and contains nearly sixty buildings, including dormitories, recitation halls, shops, a trade

Hampton Roads Conference

school, a building for domestic science and agriculture, a church, a hospital, a gymnasium, a library, a sawmill and a planing mill. The institution maintains both collegiate and academic departments, and in addition to this it provides instruction in theory and practice in nearly all lines of industry. Courses in carpentry, blacksmithing, painting and other handicraft are open to the men, while the girls are instructed in all lines of work pertaining to the home. A large stock farm of 600 acres is owned by the school and is cared for by the students. The expenses of the institution are met by contributions, but students are required to pay their board, which most of them do by working.

The influence of this institution on the education of the negro has been beyond measure, since many of its graduates have established similar schools in various parts of the country, the most noted of these being the Tuskegee Institute and Normal School, established by Booker T. Washington. See NEGRO, EDUCATION OF; INDIAN, EDUCATION OF; TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE.

Hampton Roads. See CHESAPEAKE BAY.

Hampton Roads, BATTLE OF. See MONITOR, THE.

Hampton Roads Conference, in American history, a famous conference held on a vessel near Fort Monroe, February 3, 1865, between President Lincoln and Secretary of State Seward, on the part of the United States government, and Vice-President Alexander H. Stephens, Senator Robert M. T. Hunter and Assistant Secretary of War John A. Campbell, for the Confederacy. The conference was the result of the efforts of Francis P. Blair, who hoped, by securing the coöperation of the Federal and Confederate armies against the French in Mexico, to secure a reunion of the sections and the abolition of slavery. President Lincoln refused to make any treaty with the Confederate government, as such, and consistently declined to consider any peace proposal which did not include the immediate restoration of the Union and the laying down of the arms of the Confederate armies. He declared in favor of the admission of the Southern states to representation in Congress, but only on the condition that every state should concede the validity of the Emancipation Proclamation and thus put an end to slavery within its territory. The conference lasted four hours, but accomplished nothing.

Hamster

Hamster, a genus of rodent animals, belonging to the family of mice and closely allied to the rats, which they resemble. They are distinguished by their short, hairy tails and their cheek pouches, in which they convey grain to their winter burrows. The common hamster is from ten to twelve inches long and is variable in color. Hamsters are found in central Europe and Asia.

Hancock, MICH., a village in Houghton co., opposite Houghton, on Lake Portage and on the Duluth, South Shore & Atlantic and the Copper Range railroads. The village is in the Lake Superior copper region, near the famous Calumet and Hecla mines, and contains smelting works, foundries, machine shops and other industrial establishments. It is the seat of a Finnish college. The place was settled in 1859 and was incorporated in 1863. It has increased in population about one-half during the four years following 1900. Population in 1904, 6037.

Hancock, JOHN (1737-1793), a Revolutionary patriot and statesman, born in Quincy, Mass. In the inception of the Revolutionary struggle he was a leading spirit, working both with voice and pen, and the attempt to arrest Hancock and Samuel Adams on a charge of treason was one cause of the Battle of Lexington (See LEXINGTON, BATTLE OF). Hancock was a member of the Continental Congress from 1775 to 1780, also from 1785 to 1786, and served as president of the body from 1775 to 1777, in that capacity being first signer of the Declaration of Independence. He served as governor of Massachusetts twelve years. As a legislator he was not especially broad-minded or far-seeing, but was always persistent and courageous.

Hancock, WINFIELD SCOTT (1824-1886), an American soldier, born in Pennsylvania, educated at West Point. He participated in the important battles of the Mexican War and was brevetted first lieutenant for bravery at Contreras and Churubusco. In 1861 he was made brigadier general and given command of a brigade in the Army of the Potomac. He fought at Williamsburg and at Antietam, at Fredericksburg led his men through such a fire as has rarely been encountered in warfare and at Gettysburg was dangerously wounded. In 1866 he was appointed major general in the regular army, and in the following year he was placed in charge of the reconstruction in Louisiana and Texas. This position he did not hold long. In 1880 he was the Democratic candidate for the

Hand Ball

presidency of the United States, but was defeated by Garfield.

Hand. See SKELETON.

Hand Ball, an old game, sometimes called the national game of Ireland, played by two or four persons with an elastic ball, which is knocked with the hand against a wall. Lines are drawn on the wall and on the ground, and when the ball goes outside these lines it is supposed to have struck a side wall. The back board is the boundary on the side. The service line is drawn half way between and parallel to the front wall and back board. The



WINFIELD SCOTT HANCOCK

man who begins the game is called the *striker* and stands inside the service line, while his opponent, the *player*, stands outside of it. The striker bounds the ball on the ground and strikes it with his hand so that it rebounds from the front wall. The ball must rebound outside of the service line. If it fails to do so two successive times, or if it bounds on a side wall before striking the front wall, or if it bounds outside the back board, it is called a *hand out* and the players change places. If the ball is properly served, it must be struck by the player either before it strikes the ground or after the first bound, so that it strikes the first wall. This is a return. If the player fails to return the ball, the striker scores one point. If the player returns it properly, the striker must bound it again from the front wall, and if he fails to do

Handel

so they change places. After the ball has been served, it may strike the ground anywhere inside the court. When the striker has scored or made a hand out, an inning has been played and the players change positions. The striker continues to serve after he scores, and an inning closes only when there is a hand out. The person who first makes 21 points wins the game.

Han'del, GEORGE FREDERICK (1685-1759), a German composer, born at Halle on the Saale. In 1696 he was sent to Berlin to study; later he returned to Halle and was appointed organist of the cathedral in 1702, but soon left to visit Hanover and Hamburg, where he played second violin in the orchestra. In 1704 he published his first work, an oratorio on the Passion, and his first opera, *Almira*, followed by his *Nero*. He visited England twice, and ultimately, having received a pension from Queen Anne, settled there. He was placed at the head of the newly-founded Royal Academy of Music. He produced in succession *Israel in Egypt*, *L'Allegro* and *Il Penseroso*, *Saul* and *The Messiah*. The last mentioned, which is his chief work, was brought out in 1741, for the benefit of the Foundling Hospital in Dublin. It was not much appreciated at the first presentation, but increased in reputation every year, until to-day it is considered the greatest oratorio ever written. In 1752 Handel became blind, but continued to perform in public and to compose. He was buried in Westminster Abbey.

Hand'icap'ping, a name given to the practice of placing some extra burden upon those who, in competition, have by previous performance showed their ability to do things more successfully than their competitors. In athletic events records are kept of what is accomplished by all the men; then some official, who is agreed upon, handicaps those men who need it, in such a way that apparently all are on a fair and even basis. In the races the best men start from the "scratch" and run the full distance, while others are allowed to start at different marks in front of the "scratch" line, according to the decisions of the handicappers. In horse racing the handicap is sometimes accomplished by requiring a heavier jockey to ride the horse or by weighting the saddle. In the various games different methods are used to bring about equality.

Hand Organ. See HURDY-GURDY.

Hangbird. See BALTIMORE ORIOLE.

Hang-chow, *hahng'chow*, or **Hang-choo**, a large city in China, capital of the Province of Che-kiang, on the estuary of the Tsien-tung-

Hanna

kiang. It is one of the handsomest cities in China, with many magnificent temples, monuments and triumphal arches, and it is washed on its western side by the Hsi-hu, or West Lake, a sheet of water famous for its beauty. Hang-chow is the seat of the imperial silk factory and has extensive private manufactures in silks, furs, gold and silver ornaments, tapestries, lacquered ware and fans. The greater portion of the inhabitants live without the walls in the beautiful suburbs and in boats on the river. The city is also a great center of literary and ecclesiastic life. It was opened to foreign trade in 1896. Population, estimated at 800,000.

Hanging, the most common method of inflicting capital punishment. The method is sufficiently described by the sentence which is usually pronounced by the court, that the convict "be hanged by the neck until he is dead." The sentence also fixes the time and place for the execution. Hanging has been generally adopted for the reason that it is generally considered the most humane method of capital punishment, though in recent years it has been superseded in some states by electrocution (See ELECTROCUTION). The execution was formerly a public ceremony, but in later times the tendency has been to avoid publicity.

Hanging Gardens of Babylon, the name commonly given to a structure of ancient Babylon, built by Nebuchadnezzar to please his queen, and famous as one of the seven wonders of the ancient world. These gardens were merely a series of terraces, forming a sort of tower or pyramid, planted with trees, flowers and shrubs. Men were constantly employed in pumping water from the Euphrates for irrigation.

Hankow, *hahn'kow*, (mouth of the Han), a town and river port in China, in the province of Hupeh, at the junction of the Han with the Yang-tse-kiang. The native portion of the city is dirty and crowded, but the foreign settlement, occupied by British, French, Russian and German residents, stretches for three miles along the river and is beautifully laid out, substantially built and well kept. The port of Hankow was opened to foreign trade in 1862 and has become the chief distributing center for the central provinces. The chief articles of export are tea, rice, silk, tobacco, medicines and wood oil. Population, estimated at 800,000.

Hanna, MARCUS ALONZO (1837-1904), an American capitalist and politician, born at New Lisbon, Ohio. He removed with his father to Cleveland, where he gained large

Hannibal

business interests. Turning his attention to politics, he became Republican leader of his ward, city and state, and he was chairman of the Republican National Committee from 1896 to 1904, being special sponsor for William



MARCUS HANNA

McKinley as a candidate in the convention of 1896. He was elected United States senator in 1897 and was reelected in 1903. Hanna was identified with the National Civic Federation, was for a time its president and was always one of its most prominent and useful members.

Hannibal (247-183) B. C., one of the greatest generals of antiquity, the son of Hamilcar Barca. While but a child he was made to take an oath of lasting enmity toward the Romans. At the age of twenty-two he went from Carthage to the army in Spain, then commanded by his brother-in-law, Hasdrubal, and three years after, on the murder of Hasdrubal, he received the chief command by acclamation. He now prepared to carry out his great designs against Rome, and judging that the Romans could be overthrown only in Italy, he undertook his great march on Rome across the Pyrenees, the Rhone and the Alps. He set out with ninety thousand foot soldiers, twelve thousand horsemen and thirty-seven elephants, but this force was considerably lessened before he attempted the passage of the Alps. When he arrived at the southern foot of the Alps, after fifteen days of incredible toil in crossing the mountains, his force numbered only about twenty-six thousand.

Hannibal

The point at which he crossed is generally believed to have been the Little Saint Bernard. On the banks of the Ticino he first encountered a Roman army under Scipio and defeated it, mainly by the superiority of his Numidian cavalry, 218 B. C.

Hannibal opened the next year's campaign by defeating the Roman general Flaminius, and he then marched into Apulia, spreading terror wherever he approached. Rome, in consternation, chose as dictator Fabius Maximus, who sagaciously resolved to hazard no more open battles, but to exhaust the strength of the Carthaginians by delay. In 216, however, a battle was fought at Cannae, which ended in a total defeat for the Romans, forty or fifty thousand of whom were slain. Instead of marching on Rome, Hannibal now sought quarters in Capua, where luxurious living undermined the discipline and health of his troops. The campaigns of 215, 214 and 213 were comparatively unimportant.

After this the Romans, realizing the wisdom of the old policy of Fabius, refrained from open engagements and shut themselves up in their walled towns, against which Hannibal's army proved ineffective. However, he still maintained the contest against overwhelming odds, till, in 203, he was recalled to defend his country, invaded by Scipio. In Africa he was defeated by the Romans at Zama (202 B. C.), and the Second Punic War ended, after a bloody contest of eighteen years, in Carthage having to accept the most humiliating conditions of peace. Hannibal now devoted himself as civil magistrate to restoring the resources of Carthage, and he was working at reforms of administration and finance when the jealous Romans sent ambassadors to demand his surrender. He fled to the court of Antiochus of Syria and offered his services for the war then commencing against the Romans. They were accepted, but Hannibal's advice for the conduct of the war was not followed, and he himself, as commander of the Syrian fleet, failed in an expedition against the Rhodians. Hannibal, again obliged to flee, took refuge with the king of Bithynia, and he is said to have gained several victories against the king of Pergamus, an ally of the Romans. But the Roman Senate once more sent to demand the surrender of their inveterate enemy, and Hannibal took poison rather than fall into their hands.

Hannibal, Mo., a city in Marion co., about 100 mi. n. w. of Saint Louis, on the Mississippi

River and on the Chicago, Burlington & Quincy, the Wabash and other railroads. It is an important lumber market, has a large trade in agricultural produce and contains flour mills, foundries, car works and manufactures of stoves, clothing, shoes, cigars and other articles. A large iron and steel bridge connects the city with East Hannibal, Ill. The city has a number of good public buildings, and a well organized system of public schools. The place was settled in 1819 and was incorporated twenty years later. Population in 1900, 12,780.

Hanoi, *hah'no e*, the capital and most important city of the province of Tongking, and the seat of the government of French Indo-China. It is located on the Songkoi, or Red River, on a very picturesque site. Its wide streets, some of them lighted with electricity, and its well-built houses of brick, mud or timber make it a very attractive city. The most noteworthy building of the town is the cathedral. As a commercial center the city is important, although by far the greater part of the trade is in the hands of the Chinese. Silk, rice, embroidery and pearl work are largely exported and there is also considerable trade in filigree work, leather articles and mats. Hanoi has belonged to France since 1882. Population, about 102,000.

Han'over, formerly a kingdom in the northwest of Germany, now a province of northwest Prussia. For administrative purposes it is divided into six districts, Hanover, Hildesheim, Lüneburg, Stade, Osnabrück and Aurich. The province is drained by the Elbe, Weser and Ems rivers. The Harz Mountains, in the southeast, are rich in minerals, the working of which is an important industry. The soil in the lowlands is very fertile and produces all kinds of grains, flax, hops, tobacco and potatoes. The manufactures consist of cotton, woolen goods, leather and machinery, and shipbuilding is an important industry. The chief seat of learning is the University of Göttingen. Hanover is the capital.

The early history of Hanover is that of Brunswick. It was made an electorate in 1692. Its elector, George Louis, in 1714 became George I of England, and at this time Hanover began to grow in importance, until in 1814 it was made a kingdom by the Congress of Vienna. When Queen Victoria became queen of England, Hanover, by the Salic Law, went to the nearest male heir, Ernest Augustus, duke of Cumberland, who was succeeded by his son, George V. In the war between Austria and Prussia in 1866, Hanover took the side of Austria, and the result

was its annexation to Prussia by the Peace of Prague. Population in 1900, 2,590,939.

Hanover, capital of the Prussian province of Hanover. Hanover is a manufacturing town of great importance, has cotton factories, machine works, iron foundries, chemical works, tobacco and cigar factories and other industries. It is also a railroad center and within a few years has become the fifth city in size in Prussia and the tenth in all Germany. Like other German towns, it has an old city and a new city, the latter adorned by fine monuments, public buildings and residences and noted as the seat of educational institutions of importance. Hanover was founded before 1100 and joined the Hanseatic League in 1481. It became the residence of the dukes of Brunswick-Lüneburg and capital of the principality in 1636. Population in 1905, 250,032.

Hanover, PA., a borough in York co., 42 mi. n. w. of Baltimore, Md., on the Pennsylvania and the Western Maryland railroads. It is in a fertile agricultural region near deposits of iron ore; the industries include the manufacture of shoes, cigars, carriages, machinery, gloves and other articles. The town also has a large trade in live stock and dairy and farm produce. Population in 1900, 5302.

Hansa, THE. See HANSEATIC LEAGUE.

Hans'borough, HENRY CLAY (1848-), an American politician, born in Randolph County, Ill. He moved to California in 1867, became a printer, later publisher of a daily paper at San Jose and was for a time connected with the San Francisco *Chronicle*. He was an editor at Baraboo, Wis., for two years, but in 1882 he removed to Devil's Lake in Dakota, then a territory. He was twice elected mayor of the city and from 1889 to 1891 sat in Congress. In the latter year he was elected United States senator and was twice reelected.

Han'seatic League or **Hansa**, THE, a league of certain German and other commercial cities of northern Europe, for the protection of commerce. In the middle of the thirteenth century, the sea and land swarmed with pirates and robbers, who infested the thriving ports of the Baltic and the North Sea. A compact was made, therefore, between Hamburg and Lübeck, to keep open the road across Holstein, connecting the North Sea with the Baltic. In 1247 this league was joined by Brunswick, and out of this grew the Hansa, which at its most flourishing period included about eighty-five towns, maritime and inland. Among these the town of

Lübeck was recognized as the chief, and here the deputies of the other Hanse towns assembled to deliberate on the affairs of the confederacy. During the fifteenth century the power of the league was at its height. It had armies and navies, gained victories in war over the kings of Norway and Denmark, and deposed a king of Sweden. It made thorough provision for the security of commerce on the Baltic and North seas, constructed canals, introduced a uniform system of weights and measures and developed the principles of mercantile law. But as its power and ambition increased it was felt to be an oppressive monopoly, established mainly in the interests of the great seaport towns. It became less needful, also, for commercial security, since the princes learned the advantages of trade, formed naval forces of their own and encouraged navigation. Most of the inland members of the confederation withdrew, and during the fifteenth and sixteenth centuries the cities of Hamburg, Lüneburg and Lübeck were almost alone in their active efforts to maintain the power of the Hansa.

Hansen, GERHARD (1841-), a Norwegian physician, noted for his discoveries concerning leprosy. He traveled extensively and investigated the disease wherever he found it, and he finally discovered the cause of the disease to be a bacillus. Although he was unable to discover any treatment which was effective in curing leprosy, yet by establishing the nature of the contagion he has limited the spread of it in Norway and elsewhere.

Hansom or **Hansom Cab**, a two-wheeled covered carriage, drawn by one horse. It has a low body, is closed in front with doors and has an elevated seat in the rear for the driver. Hansoms are often used in place of cabs in large cities.

Hapsburg, *hahps'boorK*, or **Habsburg**, **HOUSE** OF, the imperial house of Austria-Hungary. The name, which is a contraction of *Habichtsburg*, meaning "Hawk's Castle," is taken from the castle of Hapsburg, in the canton of Aargau. This castle, it is believed, was built in the eleventh century by Bishop Werner of Strassburg, and Werner II was the first to take the title of count of Hapsburg. Rudolf and Albert, the great-grandsons of Werner II, were the founders of the Hapsburg-Lauffenburg line and the present imperial line, respectively. Rudolf, the son of Albert, became emperor as Rudolf I in 1273, and his son succeeded him in 1298 as Albert I. In 1438 the family again came to the imperial throne, and from that time until 1806 all the

emperors except Charles VII and Francis I were Hapsburgs.

Hara-kiri, *hah'ra ke're*, or **Seppuku**, *sep-poo'ku*, a mode of suicide allowed in old Japan to criminals of the Samurai, or two-sworded class, as more honorable than public execution. It consisted in making two cuts in the abdomen, in the form of a cross. This mode of death was also frequently practiced to save dishonor or exposure. To the present day the custom is occasionally resorted to as a method of suicide.

Harbor, a general name given to any bay, creek or inlet of the sea, affording accommodation for ships and protection against the wind and sea. The chief requisites of a good harbor are accessibility, adequate depth of water and shelter from violence of wind and water. Harbors are either natural or artificial, the latter being made wholly or partly by the construction of moles, or breakwaters, and by dredging. In connection with the more important harbors, there are usually docks, in which the water is kept as nearly as possible at the same level, thus giving facility for loading and unloading. A *harbor of refuge* is primarily for shelter and must be protected by natural or artificial breakwaters. See BREAKWATER.

Harcourt, *hahr'kört*, WILLIAM GEORGE GRANVILLE VENABLE VERNON, Sir (1827-1904), an English statesman. He was educated at Trinity College, Cambridge, was called to the bar in 1854 and became queen's counsel in 1866. In 1868 he was returned to Parliament for Oxford as a Liberal, and he soon distinguished himself by his powers of satire and ridicule in debate. He became home secretary in 1880, when he lost his seat for Oxford, but was returned for Derby. In 1886 he was made chancellor of the exchequer; and after the resignation of Gladstone's ministry and the division of the Liberal party, he became a prominent leader of the Gladstone section. Later, he was leader of the Liberal party during the supremacy of the Conservatives.

Har'decanute' or **Harthacnut** (about 1019-1042), king of England and Denmark, the son of Canute. At the time of his father's death in 1035 he was in Denmark, where he was immediately recognized as king. His half-brother Harold, however, who happened to be in England at the time, laid claim to that part of their father's dominions and succeeded in getting possession of Mercia, Northumbria and Wessex. He died in 1040, and Hardecanute peacefully succeeded him. He nominally reigned until his death, but

the government was almost entirely in the hands of his mother and the powerful Earl Godwin, while he gave himself up to feasts and carousals.

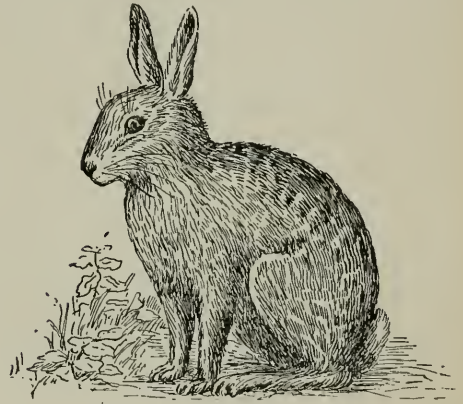
Hardee, WILLIAM JOSEPH (1815-1873), an American soldier, born at Savannah, Ga., and educated at West Point. He served with distinction in the Seminole and Mexican wars and entered the Confederate service at the outbreak of the Civil War, commanded a corps at Shiloh, Perryville and Murfreesboro and for his excellent service was made lieutenant general. He then was commissioned to defend Mississippi and Alabama, but returned to the main army, fought in the Battle of Missionary Ridge and succeeded General Bragg in the command of the Army of Tennessee, but was replaced by Polk three weeks later. Hardee fought under Johnston in the Atlanta campaign and opposed Sherman's advance to the sea, but with little effect. Later he joined Johnston, with whom he served until the surrender. After the war he became a planter in Alabama.

Hardenberg, *hahr'den berK*, KARL AUGUST, (1750-1822), a celebrated Prussian statesman. He was in the service of the margrave of Ansbach when that territory was united to Prussia in 1791, and Hardenberg was received into the Prussian service as minister of state. When war broke out between France and England in 1804, Hardenberg attempted to keep Prussia out of the struggle, and when, after the Battle of Austerlitz, Prussia was compelled to make an alliance with France, he resigned. When this alliance was dissolved later in the same year, Hardenberg was restored to power, but was again dismissed after the Peace of Tilsit, at the demand of Napoleon. In 1810 he was made chancellor of Prussia, and he zealously carried out Stein's plans for the reorganization of the Prussian states, laboring especially to arouse the national feeling in Prussia. He signed the Peace of Paris and was a representative of Prussia at the Congress of Vienna. His popularity was lost during his later years by his advocacy of a reactionary policy.

Hardness, the quality of bodies which enables them to resist indentation or scratching by other bodies. The diamond is the hardest of all natural substances. The degree of hardness of some metals is changed by heating and cooling. Iron and steel are made harder by heating to redness and cooling quickly. But if cooled slowly they are made softer. Copper is hardened by cooling slowly and softened by cooling quickly. See ABRASIVES; ANNEALING.

Hardy. *hahr'dy*, THOMAS (1840-), an English novelist, born in Dorsetshire, England. He was educated as an ecclesiastical architect and for a time worked at that profession. From 1868 he devoted himself to literature, and his first novel, *Desperate Remedies*, was published in 1871. This was succeeded by *Under the Greenwood Tree*, *A Pair of Blue Eyes*, *Far from the Madding Crowd*, *The Return of the Native*, *Two on a Tower*, *Tess of the D'Urbervilles* and *Jude the Obscure*, these last two being his most notable works. Hardy's most prominent characteristics are his strict realism and his fatalistic attitude, which regards men as helpless victims of uncontrollable circumstances.

Hare, the common name of a small animal with long ears, long hind limbs, by which it moves in long leaps, a short tail and soft hair.



HARE

The hare is distinguished from the rabbit by the fact that the former does not burrow, but builds nests in the ground, where the young are born. The common hare is found throughout Europe and in some parts of Asia. It is tawny red or brown on the back and white on the belly and is about two feet long. The *mountain hare*, or *varying hare*, confined to Northern Europe and the mountainous regions of the South, is smaller than the common hare and becomes white in winter. The *American hare*, not much larger than a rabbit, is found in most parts of North America. In North America there are also the *polar hare*, a variety of the varying hare, but of superior size and purer color, and the *prairie hare*, known as the *jack-rabbit*, from its size and length of limb. The hare, which has no courage and little cunning, is protected from its enemies mainly by its sharp sight and hearing and its extraordinary fleetness. Its voice is

never heard except when the animal is seized or wounded. It then utters a sharp, loud cry, not very unlike that of a child. Its flesh is rather dry, but it is much prized because of its peculiar flavor. Some domestic species, such as the Belgian hare, are raised in large numbers for market.

Harebell, the Scotch bluebell, a plant having a slender stem, from 4 to 6 inches high, bearing one or more bell-shaped blue flowers. Occasionally the flower is white. The harebell is common on dry and rocky soil in most districts of Europe. There are also several well-known American species.

Ha'rem (the prohibited) is used by Mussulmans to signify the women's apartments in a household, forbidden to every man except the husband and near relations. The word is also applied to the women themselves. The women of the harem may consist simply of a wife and her attendants, or there may be several wives and an indefinite number of concubines, or female slaves. The greatest harem is that of the sultan of Turkey. The women of the imperial harem are all slaves, generally Circassians or Georgians. Their life is spent in bathing, dressing, walking in the gardens, witnessing the voluptuous dances performed by their slaves and in spinning or working with the needle. The women of other Turks enjoy the society of their friends at the baths or in each other's houses and appear in public, accompanied by slaves and eunuchs; but the women of the sultan's harem have none of these privileges. It is of course only the richer Moslems who can maintain harems; the poorer classes have generally but one wife. American and European ladies have entered oriental harems during the past two centuries and studied the lives of the inmates. See ZENANA.

Hargreaves, *hahr'greevz*, JAMES (1720-1778), an English inventor. In 1760 he invented a machine for carding cotton, and some years afterward produced the spinning jenny, by which he was able to spin with several spindles at once.



HAREBELL

Suspecting that he employed machinery, his neighbors broke into his dwelling and destroyed his machine. Manufacturers stole his designs, and he was unable to secure patents upon them, so that he never profited much by his inventions, though they, with the power loom, invented by Cartwright, revolutionized the cotton industry of the world.

Harlan, *hahr'lan*, JOHN MARSHALL (1833-), an American jurist, born in Boyle County, Ky. He graduated from Center College in 1850 and studied law at Transylvania University, began practice in 1853 and became county judge in 1858. He took part in the Civil War as a Union soldier, but from 1863 to 1867 he was attorney general of Kentucky. In 1877 President Hayes appointed him associate justice of the Supreme Court, where he served with distinction for more than twenty-five years. He was one of the commissioners in the Bering Sea arbitration in 1893.

Harland, HENRY (1861-1905), an American novelist, born in Saint Petersburg. He was educated in the College of the City of New York and at Harvard and afterwards traveled in Europe as a newspaper correspondent. In London he became known as the editor of *The Yellow Book*. His earlier novels, among which were *As It Was Written* and *The Yoke of Thora*, dealt with American-Jewish life and were written under the name of Sidney Luska. *The Cardinal's Snuff-box* is one of the most popular of his later works.

Harlequin, a character of the Italian comedy, introduced into pantomimes in other countries. On the Italian stage he is a comic character, full of drolleries, tricks and knaveries, and somewhat resembles the English clown. The Harlequin of British pantomimes is somewhat different. He is supposed to be the lover of Columbine and possesses a wonder-working wand, with which he protects his mistress against Clown and Pantaloon, who pursue and endeavor to capture her, until the pursuit is brought to a termination by a good fairy. The Harlequin wears a tight dress of bright colors, glittering with spangles. In common usage the term has come to be almost interchangeable with clown.

Harley, ROBERT, Earl of Oxford and Mortimer (1661-1724), an English statesman. Although he was a Whig at the time of his entering Parliament his views changed, and after the accession of Anne, he, with his colleague, Saint John, afterwards Lord Bolingbroke, became leaders of the Tories. He was chosen speaker of the House of Commons in 1701 and in 1704

was appointed chief secretary of state, a position which he held for four years. After the fall of Marlborough, Harley again came to power and received the office of chancellor of the exchequer. Early in the reign of George I he was impeached of high treason, on the ground of alleged Jacobite intrigues, was imprisoned for two years and then brought to trial. Owing to the inability of the two Houses of Parliament to agree about the mode of procedure, he was acquitted.

Harmon'ica, Franklin's name for a musical instrument constructed with glasses of different sizes, revolved by means of mechanism worked by the foot and played upon by touching the rim of the glasses with the moistened finger. It constituted the "musical glasses" of Goldsmith's era. The name is now sometimes applied to the instrument more commonly called the mouth organ. It has a flat, oblong body, with compartments containing delicate brass reeds, which are caused to vibrate by the inhalation or exhalation of the breath.

Harmon'ics, the accessory sounds accompanying the predominant and apparently simple tone of any string, pipe or other sonorous body. No purely simple sound, that is, no sound whose vibrations are all of the same size, is producible in nature. When a sound is produced by the vibration of a string, the whole string vibrates as a unit, giving rise to a tone called the *fundamental*. The string, however, further divides into various sections, which vibrate separately and more rapidly and produce sounds differing from the fundamental, but bearing certain fixed proportions to it; these are its *harmonics*. The first harmonic of the fundamental note of any string is that produced by half the string and is the octave of the fundamental; the second harmonic is given by each third of the string and is the fifth, or dominant, of the fundamental note, and so on, the complete series of harmonics containing all the notes of the musical scale. But while harmonics enter into the composition of every musical sound, different vibrating bodies suppress some and emphasize others, thus producing different qualities of tone. See **MUSIC**; **SOUND**.

Harmo'nium, a small reed organ in which the bellows is operated by the feet of the performer. See **ORGAN**.

Har'mony, that part of the science of music which deals with chords, their structure and relations. It is a fundamental branch of musical theory and composition, and its importance can readily be seen from the fact that any simple

melody can be made to arouse widely different emotions when given different harmonic settings. Innumerable examples of this principle are found in the works of all great composers, for often the beauty and power of their compositions depend in large measure upon the harmonies which they are able to form about a single simple theme.

The same term is used to denote the concord of two or more strains or sounds, differing in pitch or quality, as opposed to melody, which consists of a pleasing series of single tones. See **MUSIC**; **CHORD**; **COUNTERPOINT**.

Harmony of the Spheres, a supposition of Pythagoras and his school, that the motions of the heavenly bodies produced a music which could not be heard by men. He supposed these motions to conform to certain fixed laws, which could be expressed in numbers corresponding to the numbers which give the harmony of sounds.

Harmsworth, ALFRED CHARLES WILLIAM, Sir (1865-), an English journalist, born near Dublin. He was educated privately and at the Stamford Grammar School, and in 1882 he became editorial writer for the *Illustrated London News*. Six years later he began the publication of the weekly journal *Answers*. In 1894 he became editor and proprietor of the *London Evening News* and in 1896 founded the *Daily Mail*. Two years later he founded *Harmsworth's Magazine*, devoted to literary, scientific and political discussions. He is most generally known as the organizer and promoter of the Jackson-Harmsworth Arctic expedition of 1894. Upon a visit to the United States in 1900, he published a special issue of a New York daily paper, to indicate his views of the newspaper of the future. It was in the form of a magazine.

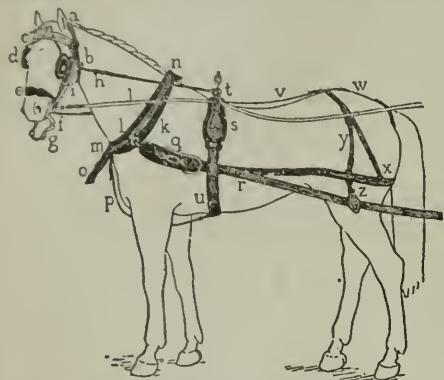
Harness, a tackle or working gear of a horse, mule or other draft animal, except the ox. Harness is usually made of leather, but in some countries it is made of leather and cords combined. Harness used with driving carriages is often highly ornamented with brass, silver or gold plate. The parts of the harness are shown in the cut. The blinds, however, are now generally omitted. (See illustration on next page.)

Harold or **Harald I** (about 850-934), king of Norway, one of the greatest monarchs of that country, succeeded his father in 863. He brought all the Norwegian jarls under his power and completely subjected the country. Among the conquered jarls was Rolf, who emigrated to France, where he obtained a grant of land and established himself as first duke of Normandy. Harold partially freed Norway from the pirate

Harold

and brigands who had long disturbed the country.

Harold or **Harald III** (surnamed *Haardraade*, Hard Ruler) (1015-1066), king of Norway. He spent a number of years in Constantinople, as a member of the emperor's



a, crown; b, cheekpiece; c, front; d, blind; e, nose-band; f, bit; g, curb; h, check; i, throatlatch; j, rein; k, collar; l, hame; m, hame-link; n, hame-strap; o, pole-strap; p, martingale; q, trace-tug; r, trace; s, saddle; t, terret; u, bellyband; v, turnback; w, crupper; x, breeching; y, hipstrap; z, trace-bearer.

bodyguard, and had many adventures in Sicily and at Jerusalem. In 1046 he returned to Norway and was made by the king, his nephew, joint ruler, and two years later, on the death of the king, he became sole ruler. He took part with Tostig, brother of Harold II of England, in his attempt to wrest the crown of England from Harold II, but was killed in the Battle at Stamford Bridge.

Harold I (surnamed *Harefoot*), a Danish king of England, who succeeded his father Canute in 1035 as king of the provinces north of the Thames and became king of all England in 1037. His countrymen, the Danes, maintained him upon the throne against the efforts of Earl Godwin in favor of Hardecanute, and Harold finally won the earl to his support. Harold died in 1040.

Harold II (1022?-1066), the last Anglo-Saxon king of England. His father, Earl Godwin, was constantly engaged in conflict with Edward the Confessor, but Harold became reconciled with Edward and on Edward's death in 1066 was proclaimed king by the nobles. William of Normandy asserted that Harold had taken oath to support his claims to the throne; and to avenge himself on Harold and gain possession of the crown, he invaded England in October, 1066, and met Harold at Senlac, near Hastings (See **HASTINGS, BATTLE OF**; **WIL-**

Harper

LIAM I, THE CONQUEROR). Harold was killed in the battle.

Harp, a stringed instrument of great antiquity, still commonly played throughout the world and forming the national symbol of Ireland. The modern instrument is nearly triangular in form, and the strings are stretched from the upper part to one of the sides. It stands erect and is played with both hands, the strings being struck, or pulled, with both fingers and thumbs. The modern harp was perfected by the invention of pedals by Sebastian Erard in 1820. By means of these, two changes in the length of the strings can be made, with corresponding changes in pitch. The harp is commonly used with fine effect in orchestra music. Wagner's music at times calls for six or eight of the instruments in a single composition.

Harper, **WILLIAM RAINEY** (1856-1906), an American educator, born at New Concord, Ohio. He was educated at Muskingum College, afterwards became professor of Hebrew at the Baptist Union Theological Seminary in Chicago and in 1879 was elected professor of Semitic languages in Yale University. Later he was principal of the Chautauqua College of Liberal Arts and director of the Chautauqua system.



WILLIAM RAINEY HARPER

In 1891 he became president of the University of Chicago. Under his administration this university was developed and brought to a high



JOEL CHANDLER HARRIS (UNCLE REMUS)

stage of excellence. Doctor Harper had a world-wide reputation as a student of Hebrew and other oriental languages. He was the author of *The Elements of Hebrew*, *Elements of Hebrew Syntax* and a number of other similar works. He was also editor of the *American Journal of Theology* and the *American Journal of Semitic Languages and Literature*, both published at the University of Chicago.

Harper's Ferry, W. VA., a town in Jefferson co., on the Baltimore & Ohio railroad, 55 mi. n. w. of Washington, D. C. Harper's Ferry had an interesting history in the Civil War. It was the scene of the famous raid of John Brown, Oct. 16, 1859 (See BROWN, JOHN). At the outbreak of the war it was abandoned by a small Union garrison and was occupied by Confederates, first under Colonel ("Stonewall") Jackson and afterward under Gen. Joseph E. Johnston. It was evacuated June 15, 1862, and afterward it was occupied by a Union force of 12,500, which in turn was captured by General Jackson, September 15, during Lee's first invasion of the North. Population in 1900, 896.

Har'pies, the ancient Greek goddesses of storms. Their parentage, ages, appearance, names and number are very differently given by the poets. In the Homeric poems they are merely storm winds. Hesiod represents them as two young virgins of great beauty, called Aëlo and Ocyete, but the later poets and artists vied with one another in depicting them under the most hideous forms, covered with filth and polluting everything in contact with them.

Harpoon', a sort of spear used in killing whales and other large fish. The head has a sharp, wedge-shaped point, with barbs, and is usually of the same piece as the handle, which is about three feet in length. The harpoon is fastened to a long rope, that is coiled in the boat. When the boat approaches near the whale, the harpoon is thrust into his body. The rope can be paid out or taken up, as the safety of the boat requires. The bomb lance, which is a hollow harpoon containing a shell filled with gunpowder, is now used in catching whales. The lance is shot from a gun, and when it enters the body of the whale the bomb explodes and kills him instantly.

Harp'sichord, *harp'se kord*, a keyed, stringed instrument, similar to a piano, but now rarely used. The keys were in front as in the piano, and when pressed by the fingers they raised little upright, oblong slips of wood, called *jacks*, furnished with crowquill plectrums, which

struck the wires, causing them to vibrate and to give forth a sharp, thin tone. See PIANO.

Harpy, a large and very powerful eagle of the tropics, that sometimes strays as far north as the Southern United States. It is larger than the golden eagle, but has a somewhat shorter expanse of wing. Its bill is crooked; its claws are extremely strong and sharp, and the muscles of its shoulders are exceedingly powerful. The harpy is dark gray, barred with black above and white below, except for a dark band across its breast. Its head bears a handsome crest. It will defend itself even against man, when wounded, but in spite of the numerous stories told of its marvelous fierceness and strength, it is doubtful if it ever attacks man of its own accord. Its feathers are used by indians for decorative purposes and for giving accuracy to their arrows.

Har'raden, BEATRICE (1864-), an English novelist, born at Hamsted. After studying in various English and European schools, she took her degree from the University of London. In 1894 and 1895 she traveled in the United States and lived for some time on a California ranch. Her *Ships that Pass in the Night*, published in 1893, became immensely popular, but her other works have never attained a like success. Among these are *In Varying Moods*, *The Fowler* and *Hilda Strafford*.

Har'rier. See MARSH HAWK.

Harriman, EDWARD HENRY (1848-1909), an American capitalist and railway owner, born at Hempstead, Long Island, the son of an Episcopal clergyman. At fourteen years of age he left school and went into a broker's office in New York. At twenty-two he became a member of the stock exchange and continued in the brokerage business until, in 1887, he was elected vice-president of the Illinois Central. His greatest work was the reorganization and rebuilding of the Union Pacific Railroad and this was followed by the acquirement of the Southern Pacific and its western connections. Besides the roads mentioned, the Illinois Central, Chicago & Alton, Baltimore & Ohio, Pennsylvania and others are either owned by Harriman or are closely allied with him. His country estate at Arden, N. Y., contains 26,000 acres, largely woodland. His home is in New York City. He has built a magnificent clubhouse on the East Side, where 10,000 poor boys are allowed to enjoy themselves.

Harris, JOEL CHANDLER (1848-1908), an American author, popularly known as "Uncle Remus," was born in Eatonton, Ga. He served apprenticeship to the printer's trade, then

studied law and finally settled down to journalism. In 1876 began his connection with the *Atlanta Constitution*, which lasted for twenty-five years; and for this paper he wrote the first of those negro dialect fables which were afterward published as *Uncle Remus: His Songs and Sayings* (1880). These sketches received such a warm welcome that *Nights with Uncle Remus* and *Uncle Remus and His Friends* soon followed. The hero of these stories is "Brer Rabbit." Harris was one of the most popular southern writers of fiction. His stories form a valuable contribution to American literature, by reason of their intimate, faithful pictures of southern life and their accurate reproductions of negro dialect. His best works, besides those mentioned above, are *Daddy Jake, the Runaway*; *Sister Jane*; *Stories of Georgia*; *Free Joe*; *Aaron in the Wildwoods*; *Tales of the Home Folks*; *Balaam and His Master*, and *A History of Georgia*.

Harris, WILLIAM TORREY (1835-1909), a distinguished American educator, born at Kil-



WILLIAM TORREY HARRIS

lingly, Conn., and educated at Yale University, which he entered in 1854. He began teaching in Saint Louis, Mo., and became superintendent of the Saint Louis public schools in 1867. The same year he founded *The Journal of Speculative Philosophy*, which he long continued to edit. This was the first journal of the kind in

America and in the English language; it has contained many original articles by Doctor Harris on philosophical questions, as well as many translations from European writers. While superintendent of the Saint Louis schools, Doctor Harris became widely known through his reports, which showed remarkable insight into educational problems and were sought by educators at home and abroad. He was elected president of the National Educational Association in 1875 and represented the United States at the International Congress of Educators, which met at Brussels in 1880. In 1889 he prepared the official *Statement of the System of Education of the United States*, for the Paris and Vienna expositions. In the same year he was appointed United States Commissioner of Education, which position he held until June, 1906, when he was made the first beneficiary of the Carnegie Foundation fund and retired. Doctor Harris was the author of numerous articles and works on philosophical and educational subjects and the leading public school educator of America for a third of a century.

Harrisburg, PA., the capital of the state and the county-seat of Dauphin co., 105 mi. w. by n. of Philadelphia, on the Susquehanna River, on the Pennsylvania Canal and on the Philadelphia & Reading, the Pennsylvania, the Northern Central and other railroads. The city is picturesquely situated along the river, which is here a mile wide and spanned by five bridges. The most prominent building is the state capitol, designed and executed under the direction of Joseph M. Huston, and costing more than \$4,000,000. It covers a larger area than Saint Paul's at London. The frontage is 520 feet 8 inches, and there are three wings projecting to the rear. The dome is 241 feet from the grade line to the hall and has inscriptions from the writings of William Penn, the top being surmounted by a colossal figure 10 feet 6 inches in height. Subsidiary domes serve to light the corridors. The outside of the building is of granite from Hardwick, Vt. The marble work in the rotunda and corridors is American white from Vermont. The sculptural work was done by George Grey Barnard. The mural paintings in the governor's reception room were painted by Violet Oakley, while those in the dome, senate chamber, house of representatives and supreme court room were painted by Edwin A. Abbey. The bronze doors at the three main entrances are specimens of superior workmanship. At the main entrance is a large fountain, on

Harrison

each side of which a wide stairway leads up to a circular portico, which serves as a reviewing stand. The dedicatory address was delivered by President Roosevelt on Oct. 4, 1906. In an adjoining building is the large state library and a valuable collection of various curiosities. The city has a large public library, a good high school, a conservatory of music, and various hospitals, churches and charitable organizations. Other prominent buildings are the governor's mansion, the state arsenal, the state hospital for the insane, the county prison, the Y. M. C. A. and a number of business blocks. The city has excellent transportation facilities and conducts a large trade in lumber and other goods. The iron and coal mines close at hand have led to the development of an extensive iron and steel industry. Harrisburg has one of the largest boot and shoe factories in the United States, a large silk mill, a carriage factory, engine works, electrical plants, breweries and other factories.

In 1726 the English trader John Harris settled there. A ferry was established later, and the place was known as Harris's Ferry, until a town was laid out in 1785 and called Harrisburg. In 1812 it was made the capital of the state, and it was chartered as a city in 1860. Population in 1900, 50,167.

Harrison, N. J., a city in Hudson co., on the Passaic River and on the Pennsylvania, the Lackawanna and the Erie railroads. It is a suburb of Newark, which has a branch post-office here, but Harrison maintains an independent city government. The extensive industries include a large steel plant, engine works, machine shops, breweries and manufactories of trunks, refrigerators and other articles. The New Jersey soldiers' home is located here. The place was settled as early as 1668 and was incorporated in 1873. Population in 1905, 12,823.

Harrison, BENJAMIN (about 1740-1791), an American Revolutionary patriot and signer of the Declaration of Independence, born at Berkeley, Va. He was one of the conservative patriots and opposed Patrick Henry's early resolutions against the Stamp Act, but later he represented Virginia in the Continental Congress and rendered important service as president of the board of war. Returning to his state, he was speaker of the house of burgesses from 1777 to 1782, and for three years thereafter he was governor. He opposed the ratification of the Federal Constitution by Virginia.

Harrison, BENJAMIN (1833-1901), an American statesman, the twenty-third president of

Harrison

the United States, born in North Bend, Ohio. He was the grandson of William Henry Harrison, ninth president of the United States, and the great-grandson of Benjamin Harrison, a signer of the Declaration of Independence. In 1852 he graduated from Miami University and went to Cincinnati, where he studied law. Two years later he removed to Indianapolis, Ind., where he built up a large law practice. When the war broke out, he entered the Union army as lieutenant, but was soon promoted to colonel and organized the Seventeenth Indiana Volunteers.



BENJAMIN HARRISON

He fought bravely in the Atlanta campaign and about Nashville, and at the close of the war he had won the rank of brigadier general.

He became supreme court reporter, but in 1868 returned to the practice of law. In 1876 he was nominated by the Republican party for governor of Indiana, but was defeated. He was elected United States senator in 1880, serving one term, and was a conspicuous advocate of civil service reform and of restriction of Chinese immigration. Harrison was nominated for president in 1888 by the Republican National Convention at Chicago and was elected by a good majority, receiving 233 electoral votes to 168 for President Cleveland, the Democratic nominee. Among the important measures adopted during his administration were the McKinley tariff bill, the suspension of the Louisiana lottery, the establishment of the reciprocity policy, the extension of the navy,

the settlement of troubles in Chile and Samoa and the Bering Sea fisheries arbitration. Mr. Harrison was nominated for a second term in 1892 by the Republicans, but was defeated by his predecessor, Grover Cleveland. He returned to Indianapolis and resumed the practice of law, but became a professor of international law at Leland Stanford University. He appeared as counsel for Venezuela before the arbitration tribunal in 1899 and was chief representative of the United States at the Hague Peace Conference.

Harrison, CARTER HENRY (1860-), an American politician, born at Chicago, the son of Carter H. Harrison, who was five times mayor of Chicago. He was educated in the Chicago public schools and in Germany and graduated at Saint Ignatius College in Chicago in 1881 and from the Yale Law School two years later. He entered upon the practice of law, later engaged in the real estate business and for three years was publisher and editor of the *Chicago Times*. In 1897 he was elected mayor of the city and was reelected in 1899, 1901 and 1903 as a Democrat.

Harrison, CONSTANCE CARY (1846-), an American author, born in Virginia. She was married to Burton Harrison, a Virginia lawyer, the private secretary of Jefferson Davis. She contributed extensively to the periodicals and wrote many books. *Old Fashioned Fairy Book* and *Folk and Fairy Tales* are for younger readers. Of her plays, *The Unwelcome Mrs. Hatch* is probably the best known.

Harrison, WILLIAM HENRY (1773-1841), an American statesman and soldier, ninth president of the United States, born in Charles City County, Va., and educated at Hampden-Sidney College. His father, Benjamin Harrison, was one of the signers of the Declaration of Independence. After his father's death, Harrison joined the army which Wayne was leading against the Northwestern indians and showed great gallantry at the battle on the Miami (1794). He represented the Northwest Territory as a delegate in Congress in 1799-1800 and succeeded in securing the passage of a valuable law relating to the sale of the Federal land in small parcels. When Indiana Territory was formed (1800), including the present states of Indiana, Illinois, Michigan and Wisconsin, besides parts of Minnesota and Ohio, he was appointed its governor, and acted with rare ability and courage until 1813. He labored courageously to win the friendship of the indians,

but was compelled to quell Tecumseh's outbreak and to beat off a fierce and treacherous attack under Tecumseh's brother, The Prophet, ending in an important battle at Tippecanoe (November 7, 1811).

In the War of 1812 Harrison was appointed major general of Kentucky militia, then brigadier general in the regular army, with chief command in the Northwest. He repulsed the British force under Proctor, and by the victory of Perry on Lake Erie he was enabled to pursue the invaders into Canada, where, on October 5, 1813, he totally routed them in the Battle of the Thames. In 1816 he was elected to Congress



WILLIAM HENRY HARRISON

and in 1824 became a United States senator. In 1828 he went as ambassador to Colombia, but was recalled the following year and for twelve years was clerk of a county court in Ohio. He was nominated for the presidency in 1836 by Whig conventions in several states, but received only 73 electoral votes against Van Buren's 170; but four years later, the Whig party having been reunited, he was nominated as a compromise candidate and defeated Van Buren, obtaining 234 electoral votes to the latter's 60. The contest is noteworthy as having witnessed the introduction of enormous mass meetings and processions and picturesque emblems and banners. It is known as the "Hard Cider and Log Cabin" campaign. Harrison died a month after his inauguration, being succeeded by John Tyler.

Harrow

Harrow, an implement used by farmers for pulverizing the soil on plowed ground. The common harrow is a wooden frame, square or triangular, into which iron teeth have been driven. As the harrow is dragged over the ground by horses, it breaks up the soil and prepares it for the seed. Grain sown by hand is covered by harrowing. The wheel harrow has revolving disks of steel, instead of teeth, and is used to pulverize the soil on newly broken ground.

Hart, ALBERT BUSHNELL (1854–), an American historian and teacher, born at Clarks-ville, Pa. He graduated at Harvard in 1880 and soon after became an instructor in the institution, later being made professor of history. He early engaged in literary work and published numerous works on the history and government of America, of which the most important are *Introduction to the Study of Federal Government*, *Essays on American Government*, *The Formation of the Union* (Epochs of American History Series), *Guide to the Study of American History* (with Edward Channing) and a biography of Salmon P. Chase (in the American Statesmen Series). He was also the editor of the Epochs of American History Series, of the *American History Told by Contemporaries*, the *Source-Book of American History* and of the *American Nation*, a history of the United States by associated scholars. He also became joint editor of the *American Historical Review* and of the *American History Leaflets*.

Harte, FRANCIS BRET (1839–1902), an American poet and short-story writer, born at Albany, N. Y. His father died while he was but a boy, and he went with his mother to California, where he made a scanty living by attempts at teaching, mining and printing. He became at length editor of the *Weekly Californian*, and in this paper appeared his *Condensed Novels*, parodies on the styles of various authors. Although these were very successful, it was not until the publication in the *Overland Monthly* of *The Luck of Roaring Camp* and *The Outcasts of Poker Flat* that he acquired national fame. A professorship in the University of California was given him, but he held it only a short time, returning to the East, where he made a contract to write only for the *Atlantic Monthly*. After serving as consul at Crefeld, Germany, and at Glasgow, he settled near London, where he lived until his death.

The two stories mentioned above, *The Luck of Roaring Camp* and *The Outcasts of Poker Flat*,

Hartford

are Harte's most successful attempts in his most successful field. The picturesqueness of the phases of California society which he described might have made popular even less striking tales than these. Harte possessed the ability to tell a story vividly and tersely, allowing his characters



BRET HARTE

to reveal themselves in their own words and actions without unnecessary descriptions. Among the more famous of his other stories are *Tennessee's Partner* and *How Santa Claus Came to Simpson's Bar*. Of his humorous poetry the best known is *Plain Language from Truthful James*, better known as *The Heathen Chinee*.

Hartford, CONN., the capital of the state and the county-seat of Hartford co., 124 mi. w. by s. of Boston and 110 mi. n. e. of New York City, on the Connecticut River, at the mouth of Park River, and on the Central New England and several lines of the New York, New Haven & Hartford railroad. The city has a beautiful state capitol, constructed of white marble, which is one of the finest in the country. Among notable monuments are the soldiers' memorial arch over the Park River, and the Corning Fountain. The Hartford Theological Seminary and Trinity College are located here, besides several other educational institutions. There are many large libraries and also a large number of charitable institutions. The city has several pretentious insurance buildings, including the Connecticut Mutual Life, the Aetna Life, the

Phoenix Mutual Life and the National Fire, and it is for its insurance interests that Hartford is probably best known. Other prominent structures are the Saint Joseph Cathedral, the post-office, a state arsenal and the Cheney building.

The position of the city, at the head of deep water navigation, has made it an important distributing center. The city was made a port of entry in 1887. Manufacturing was early developed, and the principal products are firearms, bicycles, automobiles, boilers, engines, woven wire, knit goods, typewriters and other articles. The city contains one of the largest publishing houses in the country. The *Courant* was started in 1764 and is now the oldest newspaper in the United States.

About 1633 the Dutch built a fort here, which they called "House of Hope." In 1637 some Puritan colonists made a settlement and called it Hartford. The freemen of Hartford, Windsor and Wethersford assembled here on January 14, 1639, and adopted the "Fundamental Orders of Connecticut," said to be the first written constitution ever drawn up in America. Hartford was the capital in 1701 and then shared that honor with New Haven, but since 1873 it has been the sole capital. Among the people who have been connected with Hartford are Noah Webster, John Fiske, Harriet Beecher Stowe, John Trumbull, Horace Bushnell, Charles Dudley Warner and Samuel Clemens (Mark Twain). Population in 1906, 79,850; in 1903, estimated at 87,836.

Hartford City, IND., the county-seat of Blackford co., 72 mi. n. e. of Indianapolis, on the Lake Erie & Western and the Pittsburg Cincinnati, Chicago & Saint Louis railroads. The city is surrounded by an agricultural region and is supplied with natural gas. The manufactures include paper, glass, iron, flour and other articles. Population in 1900, 5912.

Hartford Convention, a famous assembly at Hartford, Conn., from December 15, 1814, to January 5, 1815. Massachusetts, Connecticut and Rhode Island were represented by delegates, while New Hampshire and other New England states were represented by proxy. It was the outgrowth of opposition of the Federalist party to the War of 1812 and to the conduct of the war by the Anti-Federalist, or Democratic, administration. The sessions of the convention were secret, and there were false rumors that it planned the secession of New England. Its real aim was to propose reforms in the government in the direction of greater independence for the

states. It was one of the events which led to the final downfall of the Federalist party.

Har'thacnut. See HARDECANUTE.

Harts'horn, in pharmacy, the horn of the common stag, from which substances deemed of high medical value were formerly prepared by distillation, such as spirits of hartshorn, oil of hartshorn and salt of hartshorn. The active ingredient of these was ammonia, which is now obtained from gas liquor and other sources. See AMMONIA.

Harun-al-Rashid, *hah roon'al rah sheed'*, (?-809), a celebrated caliph of the Saracens. The popular fame of this caliph is evinced by the *Arabian Nights Entertainments*, in which Harun, his wife, Zobeide, his vizier, Giaffar, and his chief eunuch, Mesrour, are conspicuous characters.

Harvard, JOHN (1607-1638), an English clergyman, born in Southwark, London. He was educated at Emmanuel College, Cambridge, and came to America in 1637, settling at Charlestown, Mass. The following year he died and bequeathed his library of about 300 volumes and an estate of £400 to the college at New Towne, which had been established two years previous by order of the Massachusetts General Court. From this he is considered the principal founder of Harvard College, which was named for him and which has since grown to Harvard University.

Harvard University, the oldest and largest university in the United States. It was established at New Towne (now Cambridge, Mass.) in 1636 by order of the General Court of the Colony of Massachusetts Bay, and two years later was named Harvard College, in honor of Rev. John Harvard, who, at his death, bequeathed the institution half his property (probably about \$2000) and his library of 300 volumes. The first class of nine members was graduated in 1642. In this year the college was placed under the management of a board of overseers and in 1650 it became a corporation under the name of the President and Fellows of Harvard College; the overseers and the corporation still remain the governing boards of the college. Previous to the Revolutionary War and for some time after, the institution was crippled by religious and political dissensions, and by lack of financial support. Since 1834 it has been entirely non-sectarian and has included in its board of overseers, corporation and faculties, members of all religious denominations. The present teaching force numbers about 550, and the enrollment of the university in all departments is about 5500. The

value of its property, exclusive of books and collections, is \$28,000,000, which includes an endowment fund of over \$19,000,000. The annual income, exclusive of gifts and bequests, is about \$1,500,000.

The university maintains seventeen departments: (1) Harvard College; (2) the Lawrence Scientific School; (3) the Graduate School of Arts and Sciences; (4) the Graduate School of Applied Science; (5) the Divinity School, which is entirely non-sectarian; (6) the Law School; (7) the Medical School; (8) the Dental School; (9) the Bussey Institute, a scientific school of agriculture and horticulture; (10) the Arnold Arboretum, a site of 220 acres located in West Roxbury and devoted to forestry and arboriculture; (11) the University Library, which includes the general and the departmental libraries and numbers in all over 700,000 volumes and over 300,000 pamphlets; (12) the Museum of Comparative Zoölogy, founded by Professor Agassiz (See AGASSIZ, LOUIS); (13) the Peabody Museum of Archaeology and Ethnology; (14) the University Museum, which includes museums of botany, mineralogy, geology and art; (15) the Botanic Garden; (16) the Gray Herbarium, containing collections donated to the university by Professor Gray (See GRAY, ASA); and (17) the Astronomical Observatory, with its main station at Cambridge and a branch station near Arequipa, Peru. A summer school is maintained by the University for the instruction of teachers and others who wish to take special work in literature, science, theology or medicine. Radcliffe College, which is affiliated with Harvard, provides for the education of women (See RADCLIFFE COLLEGE).

The University publishes a large number of scientific and literary periodicals. The most popular of these are the *Harvard Historical Studies*, *Quarterly Journal of Economics*, *Harvard Law Review*, the *Harvard Graduates' Magazine* and the *Harvard University Gazette*.

Harvest Bug, a mite, of a bright red color, so small as scarcely to be visible, resembling a grain of cayenne pepper. It appears in June or July and burrows under the skin of such domestic animals as horses, dogs and sheep. Its attacks are also very annoying to human beings.

Harvest Man. See DADDY-LONG-LEGS.

Harvest Moon, a name which calls attention to a peculiarity in the apparent motion of the full moon, by which, in the United States and high latitudes generally, it rises about the same time in the harvest season (or about the autumnal

equinox in September) for several successive evenings. In the southern latitudes this phenomenon occurs in March. It is owing to the fact that the moon is then traveling in that part of her orbit at which it makes the least possible angle with the ecliptic.

Harvey, ILL., a city in Cook co., 20 mi. s. of the Chicago courthouse, on the Illinois Central, the Grand Trunk, the Cleveland, Cincinnati, Chicago & Saint Louis and other railroads. It is a residence suburb of Chicago and has manufacturing of automobiles, stoves, railroad supplies and various machinery. Population in 1900, 5395.

Harvey, WILLIAM (1578-1657), an English physician, the discoverer of the true theory of the circulation of the blood. He entered Caius College, Cambridge, in 1593, and about 1599 he proceeded to Padua, then the most celebrated school of medicine in Europe. He took the degree of M. D. and returned to England in 1602. He settled in London, was admitted as a fellow of the College of Physicians, was elected physician of Saint Bartholomew's Hospital and in 1615 was chosen Lumleian lecturer. His views on the circulation of the blood were formally given to the world in his *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus* (On the Movement of the Heart and Blood in Animals), published at Amsterdam in 1628. In 1623 he was appointed physician extraordinary to James I, and in 1632 he became the physician of Charles I. He was present at the Battle of Edgehill and afterward accompanied Charles to Oxford. Here he was elected master of Merton College, an office which he lost on the surrender of Oxford to the Parliament. He returned to London in 1646 and spent the remainder of his life in retirement.

Harz, *hahrts*, the most northerly mountain chain of Germany, from which an extensive plain stretches to the North Sea and the Baltic. It comprises an extent of about 60 miles in length and nearly 20 in breadth, embracing the towns of Klausthal, Goslar, Blankenburg and Wernigerode. The Brocken, its highest summit, is 3742 feet high. That part of the Harz which includes the Brocken, with the neighboring high summits, is called the Upper Harz and consists entirely of granite. The southeastern portion is called the Lower Harz. The Harz abounds in woods and fine pastures and is rich in minerals, including silver, iron, copper, manganese, granite, porphyry, slate and marble.

Hasdrubal, the name of several Carthaginian leaders. Chief of these were the son-in-law and

the son of Hamilcar Barca. **HASDRUBAL**, the son-in-law of Hamilcar, succeeded the latter in command of the army in Spain in 228 B. C. He completed the subjugation of Spain, which Hamilcar had begun, and founded New Carthage. In 221 B.C. he was assassinated. **HASDRUBAL**, the son of Hamilcar and the brother of Hannibal, on the departure of Hannibal for Italy in 218 B.C., was left in command of the army in Spain, and carried on a long series of military operations against the Roman troops, which were commanded by the two Scipios. His brother Hannibal requiring his assistance in Italy, Hasdrubal led an army from Spain into that country (207 B. C.), but before he could join forces with his brother he was defeated on the right bank of the Metaurus. It is said that the Roman commander had Hasdrubal's head thrown into Hannibal's camp, by way of announcing the defeat and death of his brother.

Hashish, *hash'eeh*, an intoxicating narcotic, made in Eastern countries from an Indian hemp of that name. It produces a kind of intoxication, accompanied with ecstasies and hallucinations, ending in stupor and sleep.

Hastings, **NEB.**, county-seat of Adams co., 96 mi. w. of Lincoln, on the Burlington, the Missouri Pacific, St. Joseph & Grand Island and Northwestern railways. It is in the center of a fertile wheat belt and stock raising region, and manufactures agricultural implements, flour, brick, cement, and has a large foundry, marble works and canning factories. It is the seat of Hastings College, Immaculate Conception Academy, Adventist Sanitarium and an insane asylum. Population 1909, estimated 12,000.

Hastings, **BATTLE OF**, the name given to the battle fought at Senlac, near Hastings, in 1066, between Harold II and William, duke of Normandy. Harold, William asserted, had promised to support his claim to the throne, and when Harold allowed himself to be crowned king, William invaded England to assert his rights. The battle took place on August 14. The English were defeated, Harold himself was killed and England was brought under the rule of the Normans. This is regarded as one of the fifteen decisive battles of the world.

Hastings, **WARREN** (1732-1818), an English statesman, first governor-general of India. He was educated at Westminster School and in 1750 was sent to Bengal, as a writer in the service of the East India Company. He won distinction in Clive's campaign in 1757. In 1761 he removed to Calcutta, having obtained a seat in the Bengal

council, but he returned to England in 1764. Returning to India five years later, he became a member of the council at Madras, and three years later he was made president of the supreme council of Bengal. In 1774 he was made governor-general of India, and although his administration was most able, he was sometimes obliged to resort to questionable means for securing the large sums of money which the East India Company constantly demanded. After eleven years spent as governor-general, he resigned his office and sailed for England, leaving his empire in a most prosperous state. Shortly after his arrival in England, he was impeached by Burke and was charged with acts of injustice and aggression, with maladministration and the receiving of bribes. This celebrated trial, in which Burke, Fox, Sheridan and Grey were arrayed against him, began in 1788 and terminated in 1795 with the acquittal of Hastings. The East India Company in 1796 settled on him a large annuity, and he passed the remainder of his life in retirement at Daylesford, which he purchased.

Hat, a covering for the head. Hats are usually made of straw, silk or felt and are worn for protection or ornament. While the hat was known to the Greeks and Romans, yet as an article of dress it is of comparatively recent origin. It was never generally worn until in the fourteenth century, when the manufacture of felt hats was begun in Germany and France. Hats were introduced into England in the seventeenth century, where they replaced caps and bonnets, and the soft felt hat was introduced into America about the middle of the nineteenth century by the Hungarian patriot, Kossuth.

Felt hats are made of the hair of rabbits and hares, with a proportion of beaver's fur. The felt is manufactured over cone-shaped molds and is then stretched over a wooden block of the size and shape of the hat. The hat is then dyed and again pressed on a block, after which the surface is smoothed and finished and the sweat band, lining and other attachments are added. Straw hats are made by plaiting straw. The finest work of this sort is done in Italy, China, Japan and some of the countries of South America. There are two methods, one of plaiting the straw into braids, which are then sewed together to form the hat, and the other of weaving the straw into a fabric, which is pressed into the shape of the hats. The higher-priced hats, such as the leghorns and Panamas, are made on the latter plan. A silk hat usually has a tall, cylinder-

Hatton

shaped crown and a narrow, curled brim. The crown is made of a stiff board, covered with a glossy silk plush.

Styles in hats are constantly changing, as can readily be seen by comparing the pictures of costumes of different periods from the time of the Puritans to the present day. The Puritans wore a steeple-crowned hat. This was succeeded by the cocked hat common in Europe and America during the eighteenth century. This was followed by the felt hat. Modifications in women's hats are much more varied than in men's, especially in the style of ornamentation.

Hatton, JOSEPH (1841–), an English journalist, novelist and playwright. His first work was done for the *Derbyshire Times*, and in 1868 he became editor of the *Gentlemen's Magazine*. As correspondent for American papers he made several visits to the United States. He first became widely popular through his *Cigarette Papers*, which appeared in the *People*, but his reputation rests largely on his novels, among which are *The Dagger and the Cross*, *When Rogues Fall Out* and *In Male Attire*. He has dramatized several novels, among them *The Scarlet Letter*, which Richard Mansfield produced.

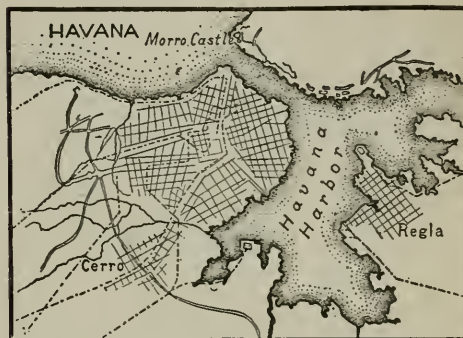
Hauptmann, *howpt'man*, GERHART (1862–), a distinguished German dramatist. His dramas and poems are powerful and intense and depict in a marvelously natural manner the actions and struggles of people in everyday life. His earlier plays, best known among which is *Before Sunrise*, are almost morbid in their close attention to the unpleasant side of life, but his later plays are distinguished rather by idealism and mysticism. Among these later plays *The Sunken Bell* is most famous.

Hausmann, *ose mah'N'*, GEORGES EUGENE, Baron (1809–1871), a French official during the Second Empire. He entered public service under Louis Philippe and distinguished himself in various departments of France, but his great work did not begin until his appointment under Louis Napoleon to the position of prefect of the Seine. While in this office he greatly improved Paris by widening streets, laying out parks and boulevards and erecting great public buildings, statues and bridges. Although his work did much toward making the Second Empire popular, he had many enemies, and his downfall was brought about in 1870. He served after this time, however, in the Chamber of Deputies.

Hautboy, *ho'boy*. See OBOE.

Havelock

Havana, *ha vah'na*, (Spanish, *La Habana*, "the haven"), an important maritime city of Cuba, capital of the Republic, is situated on the n. w. coast of the island, on an extensive and excellent natural harbor. It has an area of about nine square miles, of which about half is in the old portion of the city and is covered with buildings of quaint designs, ranged along narrow and irregular streets. However, many of the buildings, even in this quarter, are beautiful in their architecture, including the governor's palace and the cathedral, built in 1724. The city has numerous fine parks and boulevards, especially the



Prado, running outside of the city wall and terminating in Colon Park, the most beautiful in the city; the Calle de la Reina, and the Alameda de Paula. Havana formerly was famous for its unsanitary condition and its dirty, unseemly appearance, but these conditions have been much improved under the direction of Americans. The city is the chief port of the island and handles a large part of its commerce. Its own exports consist chiefly of cigars, tobacco and sugar, while it imports food and cotton. It is connected by steamship with the United States, Spain, England and France. The United States has the principal share of the trade, and Spain and England rank next. The town was founded in 1511, but was only fairly begun in 1519. Though suffering many times from depredations by Spain's enemies and by pirates, it soon became the leading Spanish station in America. The United States warship *Maine* was destroyed in the harbor, February 15, 1898. Population in 1899, 242,055.

Hav'elock, HENRY, Sir (1795–1857), a British soldier. He went to India shortly after entering the army and served with distinction in the Afghan and Sikh wars. On the outbreak of the Indian mutiny, he was dispatched to Allahabad, in order to support Lawrence at Lucknow and

Haverhill

Wheeler at Cawnpore. On arriving at Cawnpore he found that Nana Sahib had massacred the prisoners. Pursuing his march to Lucknow, he defeated the rebels in various struggles and, finally, with the aid of Outram, won the Battle of Alam Bagh. Having captured Lucknow, Havelock and Outram were shut up there until relieved by Sir Colin Campbell in November, 1857. Havelock died shortly after the relief. He was raised to the rank of major general and was made a baronet and a Knight Commander of the Bath before the word of his death reached England.

Haverhill, MASS., a city in Essex co., 33 mi. n. of Boston, on the Merrimac River and on the Boston & Maine railroad. It is an important industrial center, being one of the leading towns in the production of boots and shoes. It has also extensive manufactories of leather, shoes, machinery and supplies, hats, woolens, brick and lumber. The principal buildings include the city hall, the public library, the Masonic temple, the Hale Hospital and the Bradford Academy. The first settlement was made in 1640, on the site of the old indian town Pentucket, and during the early days the town was often attacked by indians. In 1882 the city suffered from a disastrous fire. Population in 1905, 37,830.

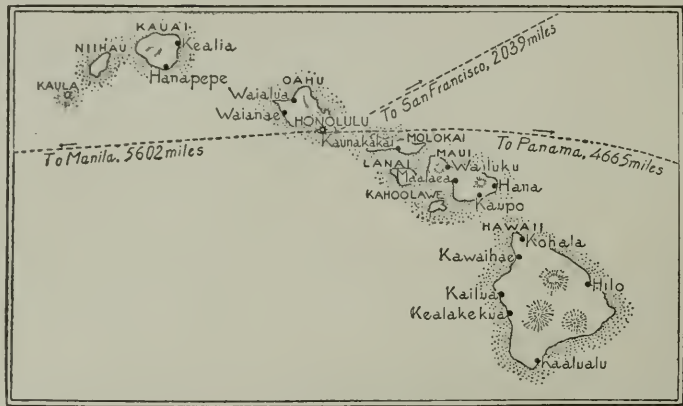
Haverstraw, N. Y., a village of Rockland co., on the west bank of the Hudson River, 32 mi. n. of New York, on the New Jersey & New York and the West Shore railroads. Steamers carry on an active trade with New York, and there are several foundries and manufactories. The manufacture of brick is extensive. Haverstraw was settled by the Dutch and was incorporated as a town in 1854. Population in 1905, 6182.

Havre, *ah'vr'*, (formerly Le Havre-de-Grâce), a seaport of northern France, in the Department of Seine-Inferieure, on the north side of the estuary of the Seine, 108 mi. n. w. of Paris. Among the chief buildings are the Church of Notre Dame, the exchange, an arsenal, the city hall, a museum and several theaters. The fortifications are extensive and make Havre a fortress of first rank. The manufactures include chemical machinery, cotton

Hawaii

goods, earthen and stone ware, paper, glass, oil, refined sugar and ropes. A government tobacco factory employs 300 workmen. The chief dependence of Havre is on its commerce, which is the greatest of all French ports, except Marseilles. It has a large trade with England and Germany and, especially, with the United States, importing large quantities of cotton and other produce. Population in 1901, 129,044.

Hawaii, *nah wi'e*, or **Hawaiian**, *hah wi'an*, **Islands**, formerly Sandwich Islands, a group of islands in the Pacific Ocean, belonging to the United States. They are situated between latitudes 18° 54' and 22° 15' north and between longitudes 154° 50' and 160° 30' west, about 2200 miles s. w. of San Francisco. There are eight inhabited islands and several smaller ones which are uninhabited, the whole group



HAWAIIAN ISLANDS

covering an area of 6740 square miles. The most important islands are Hawaii, Maui, Oahu, Kauai, Molokai, Lanai, Kahoolawe and Niihau.

SURFACE AND DRAINAGE. The islands are of volcanic origin, with coral reefs partly lining most of them, but entirely encircling none. They are mountainous; but only Hawaii is actively volcanic. This island has two of the largest craters in the world, Mauna Kea and Mauna Loa, which are 13,805 and 13,675 feet high, respectively (See MAUNA KEA; MAUNA LOA). On the eastern slope of Mauna Loa is the far-famed Kilauea, the largest active volcano in the world (See KILAUEA). The island is also traversed by other mountains, which give it a rugged and picturesque appearance, and in places bold cliffs from 1000 to 3000 feet high front the sea. The coasts, especially of Kauai, are indented with deep bays and

Hawaiian Islands

inlets. Between the mountains and the coast extend fertile plains and valleys, where agriculture is extensively carried on. The rivers of Hawaii are mostly small mountain torrents and are found in the north and the east of the island.

CLIMATE. The climate is moderate. It is never too warm and never cold. The average temperatures of the lowlands are 70° in January and 78° in July. The mean temperature is about 10° cooler than that of other countries in the same latitude. Only two seasons are recognized, and in the winter the greatest rainfall occurs. Thunderstorms are rare, but very severe, and hurricanes are unknown. The climate is on the whole very healthful.

INDUSTRIES. Agriculture is the principal industry. The soils vary in different parts of the island. In the highlands they are poor and thin, but in the lowlands they are rich and very productive. Sugar is grown in the low plains; higher up are found coffee, fruits and vegetables and pasture lands. Sugar is the staple product and is grown very extensively. Over half of the population is engaged in this industry, and the scarcity of labor has necessitated the importation of foreign laborers, especially from Japan and China. Next in importance to sugar comes rice, which is grown in the lowest flats and is cultivated mostly by the Chinese. Coffee is not grown extensively yet, but the prospects for its cultivation are very favorable. Fruits, vegetables and cereals are also grown to some extent. Among the characteristic trees found in the islands are the *koa*, the candle-nut tree and the *ohia* (mountain apple), and these are found especially in Maui. The manufactures are not important, the manufacture of sugar being the only branch of this industry which is worthy of mention. The exports are exclusively sugar, and the imports include machinery and other manufactured products. The trade is mostly carried on with the United States and has developed greatly within recent years.

TRANSPORTATION. The position of the islands is favorable for communication with most parts of the world. The territory is on the line of vessels trading between ports of western North America on the one side and eastern Asia on the other, and its position is responsible for its commercial development. Regular steamers come to Honolulu from San Francisco, Vancouver, Yokohama, Hong Kong and different points in Australia. In the islands good roads have been constructed, and there are some

Hawaiian Islands

railroads. Honolulu is a station of the American Pacific Cable and has direct communication with the United States and the Orient.

INHABITANTS. The population of Hawaii is exceedingly mixed. The native population was estimated by Cook in 1778 at 400,000, but it has rapidly decreased, the census of 1900 showing only 29,834. The total population at present includes Japanese, Caucasians and Chinese. The Caucasians consist mostly of Portuguese. In 1900 the total population was 154,000, including 61,111 Japanese, 28,533 Caucasians and 25,767 Chinese.

EDUCATION. In 1820 the earliest missionaries established schools. Four years later 2000 people had learned to read and a general public school system had been extended over the islands. A seminary for the training of teachers was established in 1831. Two years later the Oahu Charity High School, which is now the Honolulu High School, was established, and in 1836 a boarding school for boys, and three years later an industrial school, followed. The Royal School for chiefs, founded in 1840, now a school for all Hawaiian boys, was the chief school for the teaching of English. Various other mission schools have sprung up from time to time, and in 1839 the Roman Catholic missionaries established schools. In all schools the English language is used as a basis of instruction. Attendance is compulsory for the whole year for children between six and fifteen, and the schools are free. A minister of public instruction has charge of the schools, and he is aided by six commissioners.

GOVERNMENT AND RELIGION. In 1900 Hawaii became a territory of the United States. The form of government is similar to that of the other organized territories of the United States (See TERRITORY). The religion of such a population is naturally varied. The early missionaries succeeded in introducing Christianity into the islands. However, the Chinese and Japanese, who are in great numbers, generally hold to their Oriental religion. More than half of the islanders are Protestants. The Portuguese are mostly Catholics.

CITIES. The chief cities in order of size are Honolulu, one of the most excellent ports of the Pacific; and Hilo, in the island Hawaii. See separate articles on these cities.

HISTORY. The islands are said to have been discovered by Gaetano in 1542 and rediscovered in 1778 by Captain Cook, who met his death at the hands of the natives in the following

year. In early times each island had a king, but under Kamehameha I the islands were formed into one kingdom. Kamehameha died in 1819 and was succeeded by his son, Liholiho, who adopted on his accession the name of Kamehameha II, and whose reign was famous for the abolition of idolatry and the system of taboo throughout all the islands (See TABOO). Vancouver, who arrived with Cook in 1778 and returned in 1792 and again in 1794, made sincere attempts to enlighten the islanders, and he succeeded so far that he was requested by the king and his chiefs to send religious teachers to them from England. The first missionaries, however, who visited the islands came from America in 1820. The missionaries were well received, and the work of instruction was at once begun, as the king saw the necessity of introducing a new religion to take the place of the one which he had abolished. Kamehameha II and his queen visited England and both died in London in 1824.

Until the year 1840 the government of the islands was a simple despotism, but in that year Kamehameha III granted a constitution, which provided for a government consisting of a king, an assembly of nobles and a representative council. In 1843 the independence of the Hawaiian kingdom was formally guaranteed by the French and English governments. Kamehameha IV (1854-1863) was succeeded by his brother, Kamehameha V. With his death in 1873 the line of Kamehamehas became extinct, and the high chief Lunalilo was elected to the vacant throne. On his death in 1874 another high chief, Kalakaua, was elected king. This ruler died in 1891 and was succeeded by his sister, Liliuokalani. She had shown during the previous reign her reactionary tendencies, and after her accession it became clear that she intended to rule without a constitution. A revolution therefore broke out, headed by the progressive party of the state, and the queen was deposed. A provisional government was then formed and overtures were made for annexation to the United States. As these were not favorably received, the Republic of Hawaii was proclaimed July 4, 1894, with a constitution modeled after that of the United States.

Repeated efforts were made to annex the islands, and in 1898 Sanford B. Dole, president of Hawaii, visited Washington in the interest of annexation. A joint resolution of Congress was passed and signed by President McKinley

in July, 1898, in accordance with which the President appointed a commission to visit the islands and draw up a plan of government. The United States took formal possession of the islands in August, 1898. The act of Congress approved in April, 1900, made provision for a territorial government, and under this act Dole, formerly president of the Republic, took the oath of office as governor in June, 1900.

Hawk, a name given to many birds of prey, though especially to those having shorter wings than the falcons and much resembling them in habits. In the United States it is the common name for all the quick-winged species, varying in size from the large chicken hawk to the little sparrow hawk. See FALCON; FISH HAWK; KITE; SPARROW HAWK.

Hawkins, ANTHONY HOPE (1863-), an English novelist. He graduated from Balliol College, Oxford, studied law and was admitted to the bar. His literary career began with a book entitled *A Man of Mark*, published under the name of Anthony Hope. Later he published *Father Stafford*, *Mr. Witt's Widow*, *Sport Royal*, the exceedingly popular *Prisoner of Zenda* and its sequel, *Rupert of Hentzau*, *Phroso*, *The Heart of Princess Osra*, *Dolly Dialogues* and *Double Harness*. His work is marked by a vigorous, animated style and by a keen insight into the workings of the human mind.

Hawkins or **Hawkins**, JOHN, Sir (1532-1595), an English naval commander and explorer. In 1562 he made his first expedition to Africa, where he captured three hundred negroes, whom he carried to the West Indies. He compelled the West Indian traders to accept the negroes in return for other goods. Two other such expeditions were successfully carried out, but on the return from the last one he came into conflict with a Spanish fleet, was utterly defeated and escaped on a small ship. On his return to England he was elected to Parliament and given the office of treasurer and comptroller of the royal navy. The strength and efficiency of the navy were greatly increased under him, but he was accused of dishonesty in his management. As a reward for his bravery and ability in the struggle with the Spanish Armada in 1588, he was knighted.

Hawk Moth, a stout moth, with narrow wings, often seen flying about flowers, where it is often mistaken for a humming bird. Some species are very beautiful in color. See SPHINX MOTH.



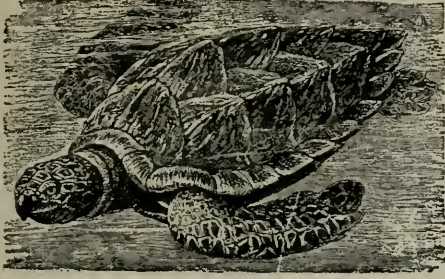
The Old Manse

HAWTHORNE'S HOMES

Wayside

Hawksbill

Hawks'bill, a large turtle found in warm seas. It has a peculiar-shaped tail which serves as a weapon of defense. From this turtle,



HAWESBILL

which is also called loggerhead and caret, is taken the tortoise shell, an important article of commerce. See TORTOISE.

Hawley, JOSEPH ROSWELL (1826-1905), an American statesman, born in Stewartville, N. C. He was taken at the age of eleven to Connecticut, was educated at Hamilton College, N. Y., and after studying law began practice at Hartford, Conn., in 1850. As a Free-Soil Democrat, he was editor of its organ, *The Charter Oak*, but later supported the new Republican party and became editor of its chief Connecticut organ, *The Evening Press*. At the opening of the Civil War he enlisted as captain of a Connecticut company and was promoted, for gallant service at Bull Run, in Florida and in Grant's Virginia campaign, to be brigadier general of volunteers. He was mustered out of the service in January, 1866, with the brevet rank of major general. Returning to Connecticut, he was elected governor, but served only one term, reëntering the field of journalism. In 1872 he was elected to Congress and again in 1878. At the end of this term he was elected to the United States Senate, and was three times reëlected, serving until his death. He was president of the Centennial Committee from its inception to the completion of its work, and he was a prominent candidate for the Republican presidential nomination in 1884.

Haw'thorn, a thorny shrub or small tree of the rose family, found wild in many parts of Europe, in north Africa and western Asia. The real hawthorn has been introduced in the United States, but it is not generally known in America. It is in general use in England as a hedge and is cultivated for the white and rose-colored blossoms, which make the country landscape very beautiful. The tree bears a small red fruit, called a *haw*, which affords a winter

Hawthorne

food for birds. The American thorn apple belongs to the same genus as the true hawthorn.

Hawthorne, JULIAN (1846-), an American author, son of Nathaniel Hawthorne, born in Boston. He studied civil engineering in America and in Germany, but practiced that profession only a short time. He spent about ten years abroad, and while in Europe wrote *Bressant* and several other successful stories. Of the novels written after his return to America, *The Professor's Sister* and *John Parmlee's Curse* are noteworthy. His stories do not follow the common form of romance and have interesting touches of mystery about them. He has also written a *History of the United States* and has contributed to the newspapers articles on the 1897 famine in India and on the Cuban War. In *Nathaniel Hawthorne and His Wife* he has made a valuable contribution to the biography of his famous father.

Hawthorne, NATHANIEL (1804-1864), the foremost of American writers of fiction, was born at Salem, Mass., July 4, 1804. His childhood,



NATHANIEL HAWTHORNE

passed with his mother at his father's home in Salem, was singularly free from the restraints of formal schooling. Spenser's *Faerie Queene*, Bunyan's *Pilgrim's Progress*, the works of Shakespeare and of Milton and the quiet natural scenes in which he loved to take solitary rambles were largely his teachers. When he was fourteen, his mother went with him to an

uncle's at Lake Sebago, Maine, and here his desire for solitude was still further developed. He spent much time wandering about in the unbroken forests or skating on the lake. In 1821 he entered Bowdoin College, where Longfellow and Franklin Pierce were his fellow-students, and from which he graduated in 1825 without having distinguished himself as a scholar. The succeeding twelve years were passed in almost complete seclusion at Salem. He wrote much, but destroyed almost all that he wrote, because it did not satisfy his own critical judgment. Various articles were written for periodicals, but they attracted little interest, and although the reprinting in 1837 of some of these, as *Twice-Told Tales*, won him praise, it did little toward helping him to maintain himself. Therefore in 1839 he accepted the position of weigher and gauger in the Boston customhouse, which he held for two years.

After a year spent at Brook Farm in what was to him largely an uncongenial experiment, he married Miss Peabody of Salem and moved to Concord, to the house which he celebrated in his *Mosses from an Old Manse*. The four years spent in Concord were happy years, although the tales which he published in periodicals and the *Mosses from an Old Manse* afforded him but a scanty living. He was surveyor of the customhouse at Salem from 1846 until 1849, when a change of political parties removed him from office. Immediately on leaving the customhouse he published *The Scarlet Letter*, which made him famous on both sides of the Atlantic. Following this came *The House of the Seven Gables* (1851) and the *Blithedale Romance*, the latter a thinly disguised account of his experiences at Brook Farm.

The election of his life-long friend, Franklin Pierce, to the presidency in 1853 brought Hawthorne an appointment to the consulship at Liverpool. After his term of office had expired, he spent a year and a half in Rome and Florence, and the record of his European years was given in the *English Notebooks* and *French and Italian Notebooks*. The greatest result of this period, however, was *The Marble Faun*, published in 1860. On his return to America he brought out *Our Old Home*, which gives further impressions of England and which was by no means favorably received in England. The *Dolliver Romance*, begun in 1864, was never finished, for the failing health of the author compelled him to abandon his work and seek to recover his strength in a tour with ex-President

Pierce, during which he died suddenly at Plymouth, N. H.

Hawthorne's was a rare personality, uniting in an unusual degree strength of intellect and will with an almost feminine refinement and sensibility. He was an optimist at heart, although frequently adjudged a pessimist, because he made the gloomier aspects of life so commonly his theme. Descended from pure New England stock, his genius was a genuine American product and gave to the traditions and tendencies of the Puritan life their most fitting expression. His style is remarkable for its clearness, ease and beauty.

Julian Hawthorne has written *Nathaniel Hawthorne and His Wife*, a biography of his father.

Hay, in the ordinary use of the term, grass cured for fodder, but in its broadest sense, hay may mean grass or various grains which have been cured for this purpose. The plants ordinarily cultivated for hay are timothy and various sorts of clover and alfalfa. Sometimes rye, oats and barley are used for a similar purpose. Native hay is made from grasses that grow wild on the great plains in the United States and in some other localities. Among these are buffalo grass and what is sometimes known as prairie grass. Cultivated grasses are usually cut before they are quite ripe and allowed to dry by lying on the ground as they are cut. However, in localities where dew is heavy or rain is liable to fall, the hay is raked together at the close of the day and bunched. If not sufficiently dry for stacking, it is spread out the next day and allowed to remain until it is dry enough to stack. Nearly all of the work in cutting and curing hay is now done by machinery (See **MOWING MACHINE**; **RAKE**). In some parts of the United States, as in New England and New York, where farms are small, the hay is stacked in barns, but in most regions it is stacked out of doors. The hay is usually bound in place by tying poles over the stacks. The top of the stack is either conical or gable-shaped, with a steep slope, so that the water readily runs off and only a small portion of the hay on the outside is affected by the weather.

Hay, JOHN (1838-1905), an American diplomatist and writer, born at Salem, Ind. He graduated from Brown University in 1858, studied law and was admitted to the bar at Springfield, Ill., in 1861. The same year he left Illinois to become assistant secretary to President Lincoln, and subsequently he became his

adjutant and aid-de-camp, positions which bore fruit in the *Life of Abraham Lincoln*, written by him in conjunction with Nicolay and considered the greatest biography of Lincoln extant. He took an active part in the Civil War, rising to the rank of colonel and assistant adjutant general. From 1865 to 1870 he was secretary of a number of foreign legations. In 1870 he returned to the United States and entered newspaper work as one of the editors of the *New York Tribune*. In 1879 he was appointed assistant secretary of state. He was appointed by President McKinley ambassador to Great Britain in 1897, and in the following year he became secretary of state, succeeding William R. Day. In 1901 he negotiated the Hay-Pauncefote Treaty, concerning the Isthmian Canal, and was prominent in the settlement of international affairs in China in the same year. He remained secretary until his death, winning a high reputation as the exponent of a frank and fair diplomacy. He was also well known as an author, among his works being several volumes of poems, essays and criticisms, notably, *Pike County Ballads*, *Castilian Days* and *Sir Walter Scott: An Address*.

Hayden, FERDINAND VANDEVEER (1829-1887), an American geologist and explorer, born in Westfield, Mass., and educated at Oberlin College and at a medical school in Albany, N. Y. Before the Civil War Hayden was engaged in exploring and surveying the Great Plains and the Rocky Mountains, but in 1861 he was made a surgeon of volunteers. After the war he resumed his work, and in 1867 he was sent by the United States government to make a geological survey of the territory of Nebraska. This organization later became the Geological and Geographical Survey of the Territories and in 1879 was formed into the United States Geological Survey. Much of this work was due to Doctor Hayden, who realized the resources and possibilities of the West and did much by his writings to make these known to the people.

Haydn, *hi'd'n*, JOSEPH (1732-1809), a celebrated musical composer, born at Rohrau, Austria. At an early age, on account of the excellence of his voice, he was appointed a choir boy at Saint Stephen's Church, Vienna. At sixteen his voice began to break and he lost his position as a chorister. Having made the acquaintance of eminent musicians, including Gluck, Haydn gradually attracted public attention and obtained many pupils. From 1761 to 1790 he was musical director to Prince Esterhazy and composed during this period a great number

of works, including some 120 symphonies for orchestra and 12 operas. In 1791 and 1794 he visited England, where he remained nearly three years and wrote his opera *Orpheus and Eurydice*. In 1798 he published his oratorio of the *Creation*, and in 1800 that of the *Seasons*. Haydn's chief merit consists in his development of instrumental composition. He practically originated the symphony and stringed quartette.

Haydon, BENJAMIN ROBERT (1786-1846), an English painter, born at Plymouth. He studied at Plymouth and in London and soon displayed remarkable ability as a painter of historical subjects. A quarrel with influential members of the academy prevented him from receiving the recognition that his paintings deserved. Most of his life was spent in poverty. Among his famous paintings are *Christ's Entry into Jerusalem*, *Lazarus*, *Christ Blessing Little Children* and *Nero Playing the Lyre during the Burning of Rome*.

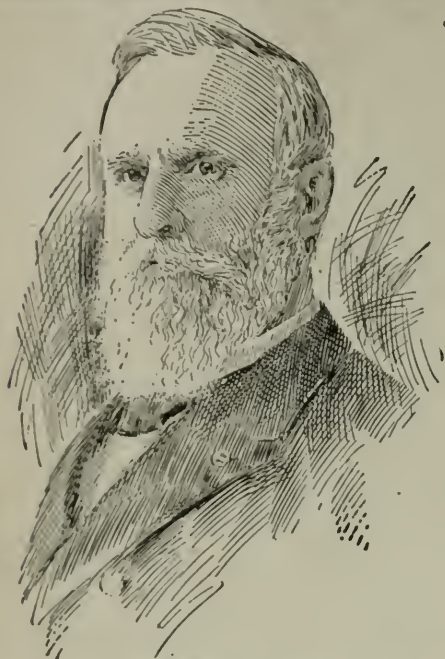
Hayes, *haze*, ISAAC ISRAEL (1832-1881), an American Arctic explorer, born in Chester County, Pa. He was a member of the expedition of 1853-1855 under Doctor Kane, and he himself commanded an expedition in 1860-1861, in order to prove the existence of an open polar sea. He served as an army surgeon during the war, and in 1869 he visited Greenland. He wrote *The Open Polar Sea* and *The Land of Desolation*. See NORTH POLAR EXPLORATION.

Hayes, RUTHERFORD BIRCHARD (1822-1893), an American statesman, nineteenth president of the United States. He was born in Delaware, Ohio, and was educated at Kenyon College, graduating at the head of his class in 1842. He studied law at Harvard and practiced at Marietta, Fremont and Cincinnati, Ohio. At the outbreak of the Civil War, he was made major of volunteers. His conduct on the field was marked by conspicuous gallantry, and he attained by meritorious service the rank of brevet major general, his most famous exploits being at the Battle of South Mountain, near Antietam; the capture of Morgan after his raid into Ohio, and in the Shenandoah campaign of Sheridan.

In 1865 he was elected a Republican member of Congress, where he won a reputation for honest and efficient hard work. In 1867, 1869 and 1875 he was elected governor of Ohio, and in 1876 was nominated for the presidency. An electoral commission, appointed by Congress, was required to decide the result of the election, which declared in favor of Mr. Hayes over Samuel J. Tilden, the Democratic nominee (See ELECTORAL COMMIS-

Hay Fever

sion). His administration was conciliatory toward the South, earnest in its efforts for the reform of the civil service and firmly opposed to questionable plans of national finance. After his



RUTHERFORD B. HAYES

retirement from the presidency his life was devoted to philanthropy, to efforts for the improvement of educational facilities in the South and to prison reform.

Hay Fever or **Hay Asthma**, a complaint that appears like a severe cold, in which there are profuse discharges from the nose, accompanied by sneezing, weeping eyes and a general feeling of lassitude and illness. Persons suffering from hay fever have annual attacks, occurring with great regularity at some time during the summer months. The majority of cases begin at some time in August and last till cold weather. The disease appears to attack persons in a weakened nervous condition and to be caused primarily by the pollen from plants or irritating dust from stables and other places. Medicines do not cure hay fever, but often a change of climate will give immediate relief.

Hayne, ROBERT YOUNG (1791-1839), an American politician, born in Colleton District, S. C. He was admitted to the bar in 1812 and soon attained prominence. He served in the War of 1812, at its close was elected to the legislature and in 1818 became attorney-general of

Hazel

his state. As a conspicuous states' rights Democrat, he entered the United States Senate in 1823, where he vigorously upheld the doctrine that slavery was not a subject for Federal legislation. He attained special fame for his brilliant debate with Daniel Webster upon the relation of the states to the Federal government, in January, 1830. In the nullification controversy of 1832 he upheld South Carolina, and soon afterward he resigned from the Senate, was elected governor of his state and issued a defiant proclamation guaranteeing the maintenance of the nullification ordinance. Later, however, he exhibited commendable moderation and marked executive ability.

Hay-Pauncefote, *pawns' foot*, **Treaty**, a treaty between Great Britain and the United States, negotiated in 1901 by Secretary of State John Hay for the Americans and Lord Pauncefote, ambassador to the United States, for the British. It recognized the right of the United States to construct, own and control a canal across the isthmus connecting North and South America and thus superseded the Clayton-Bulwer Treaty of 1850 (See CLAYTON-BULWER TREATY).

Hay'ti. See HAITI.

Haze, a condition of the atmosphere which prevents seeing objects through it distinctly. Haze varies in degrees of density and is caused in numerous ways, usually by quantities of fine dust. It may be raised by wind or by smoke arising from forest fires, as in the Rocky Mountain regions in the United States, or smoke arising from the burning of peat bogs, as in some portions of Europe. The color of the atmosphere and sky depends somewhat upon the formation of haze. That formed from smoke usually gives the atmosphere a dark, murky appearance, while that formed from dust may cause the atmosphere and sky to appear light gray, yellow or some other color, according to the color of the dust. Haze preceding a rain storm is usually caused by the presence of minute particles of vapor. The color of such haze is usually light gray.

Hazel, a genus of shrubs or small trees that belongs to Europe, North Africa, Asia and North America. The European hazel produces the nuts called filberts and grows best in a tolerably dry soil. In the United States there are two species, both of which bear small edible nuts, enclosed in a husk-like bur, covered with fine barbs. The early frost opens these burs and the nuts fall to the ground.

Ha'zen, WILLIAM BABCOCK (1830-1889), an American soldier, born in West Hartford, Vt., and educated at West Point. At the outbreak of the Civil War he was a captain in the regular army, but went to the front as colonel of a volunteer regiment. He won distinction at Shiloh, Corinth, Murfreesboro and Missionary Ridge, served through Sherman's Atlanta campaign, was prominent at the capture of Savannah and at the close of the war was brevetted major general in the regular army. For fifteen years afterward he served on the frontier, except during his absence in Europe as military attaché of the United States government. In 1880 he attained the rank of brigadier general, became chief of the signal service and accomplished a vast improvement in its equipment.

Hazleton, PA., the county-seat of Luzerne co., 24 mi. s. of Wilkesbarre, on the Lehigh Valley and other railroads. The city has a picturesque site, at an elevation of 1700 feet, in the anthracite coal region, and it has silk mills, knitting mills, foundries, machine shops and manufactories of carriages, lumber, coffins, caskets and other articles. It contains a state hospital for miners, Saint Gabriel's Academy, Hazleton Seminary, many churches and several banks. The place was settled in 1820 and was chartered as a city in 1890. Population in 1900, 14,230.

Haz'litt, WILLIAM (1778-1830), an English critic and essayist. In 1793 he became a student in the Unitarian College, Hackney, and on leaving it he devoted his time to portrait painting. This was in its turn renounced for literature, his first publication being an *Essay on the Principles of Human Action*. He delivered various series of lectures, contributed to the *Edinburgh Review* and with Leigh Hunt attempted a periodical, *The Examiner*, modeled on *The Spectator*. Among his chief works are *Characters of Shakespeare's Plays*, *A View of the English Stage*, *Lectures on the English Poets*, *Lectures on the English Comic Writers*, *Table Talk*, *Lectures on the Dramatic Literature of the Reign of Queen Elizabeth*, *Life of Napoleon Bonaparte* and *Sketches and Essays*.

Head. See SKELETON.

Headache, *hed'ake*, a pain in any part of the head, excepting the face. It is a symptom of disease, the seat of which, however, may be far from the location of the pain; as, for instance, a disordered stomach may produce pain in the forehead; neurasthenia may cause pain at the base of the brain, while a general headache may be produced by an unhealthy liver. The treat-

ment of headache should be governed entirely by the cause, when it is possible to ascertain it. The practice of taking anodynes to cure a headache is unreasonable; and it is the cause of much suffering, as in many cases it tends to create a pernicious habit. Most of the drugs are poisonous, and some of them, in certain conditions of the organs, are fatally so. In cases of chronic headache, a physician should be consulted in an effort to ascertain the cause, but acute attacks may generally be relieved by rest, lying down in a darkened room, and by careful diet.

Headdress. See HAT.

Health is that condition of the living body in which all the bodily functions are performed easily and perfectly and unattended with pain. Perfect health is rarely seen, and under the present conditions of living it can last but a short time. See HYGIENE; SANITARY SCIENCE.

Health, BOARDS OF, organizations established by a government for the purpose of protecting the health of its citizens. Boards of health are municipal, state or national, according to the authority by which they are established and the region over which they have jurisdiction. In the United States they are of municipal and state origin. Municipal or city boards of health are appointed by the city government and have jurisdiction over the region included in the city charter. Their most important duties are to prevent the spread of contagious disease by enforcing vaccination and forming and enforcing strict quarantine regulations, to prevent the adulteration of medicines and food, to prevent the sale of injurious drugs, to see that the municipality is kept free from the accumulation of garbage and other material that is liable to cause disease; also, to prescribe and oversee the duties of coroners.

State boards of health have a more general line of duties than municipal boards, and their function in many cases is advisory. Nearly all states and territories now have such boards, and their services are often of the highest value in preventing the spread of disease and in protecting the citizens of the state from the sale of injurious food products.

In the United States there is no national board of health, the duties of such a body being assumed by the marine hospital service, which is connected with the department of the interior. These duties consist chiefly in enforcing United States quarantine laws, which are enacted to prevent the entrance into the country of persons afflicted with contagious or infectious diseases.

Hearing, *heer'ing*. See EAR, subhead *Hear'ing*.

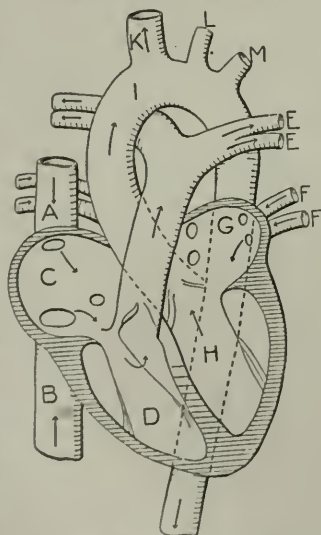
Hearst, *hurst*, WILLIAM RANDOLPH (1863-), an American editor and politician, born in San Francisco, son of George F. Hearst, a noted politician and capitalist. He received his education at Harvard University and entered journalism, becoming editor and proprietor of the San Francisco *Examiner* in 1886. He later bought the New York *Journal* and *The Advertiser* and established the *Chicago American*. He was elected to Congress from New York and was made president of the National League of Democratic Clubs. He was a prominent candidate for the Democratic nomination for the president of the United States in 1904 and was defeated for the mayoralty of New York City on the municipal ownership ticket in 1905. He was the candidate of the Democratic party of New York for governor of the state in 1906, having first been nominated by an independent party created by his efforts.

Heart, *hahrt*, a hollow, muscular organ, which forces the blood through the veins and arteries and thus maintains the circulation. In mammals and birds the heart has four chambers or cavities, two auricles and two ventricles; but in most reptiles there are but three chambers, and in some still lower orders there are but two.

The heart in man is a cone-shaped organ, situated in the chest behind the sternum and placed obliquely in an inverted position. The base points upward, inward and to the right, and the apex downward, outward and to the left. About two-thirds of the heart is to the left of the median line of the body. The heart is sus-

pended in the chest by the large blood vessels attached to it and is surrounded by a serous membrane known as the *pericardium*. A similar membrane of finer texture, known as the *endocardium*, also lines the cavities. The heart is about 5 inches long, its greatest diameter is $3\frac{1}{2}$ inches and the average weight of the organ in an adult is from 9 to 10 ounces. The walls are constructed of muscular fibers, and the muscular partition called the *septum* separates the organ into right and left sides. The left side contains the *left auricle* and *left ventricle*, and the right side, the *right auricle* and *right ventricle*. The right side of the heart forces the blood through the lungs and is connected with the pulmonary circulation. Because of the functions of this part of the heart the muscular walls are much thinner and weaker than those of the left side, whose function it is to force the blood through the arteries in the systemic circulation. The auricles occupy the base of the heart and are formed by very thin walls. The right auricle receives the blood from the *superior* and the *inferior venae cavae*, and the left auricle receives it from the *pulmonary veins*. The ventricles occupy the apex and force the blood through the arteries. Between the auricles and ventricles are valves, composed of a thin, strong white membrane, whose folds are so arranged that they allow the blood to flow from the auricle into the ventricle, but prevent its return when the muscles of the heart contract. The valve on the right side is known as the *tricuspid*, and that on the left side is called the *bicuspid*, or *mitral*, valve. The openings into the arteries are also guarded by valves, which in shape resemble a half-moon and are called *semilunar* valves. The course of the blood through the heart is illustrated in the diagram. See CIRCULATION and *color plate*.

Heat, *heet*. We recognize heat through the sense of touch. One body is hot; that is, it has considerable heat. Another is said to be warm; that is, it has a medium amount of heat. A cold body has but very little. All bodies have some heat, and *cold* is only a relative term, showing that the body to which it is applied has but little heat. The *temperature* of a body is its degree of heat. Hot bodies have a high temperature, and cold bodies, a low temperature. All bodies near one another have a tendency to become of the same temperature. If we place a hot iron on a cold one, in the course of time both become of the same temperature. Objects in the same room are usually of nearly the same temperature.



HEART AND BLOOD VESSELS

A, B, Superior and inferior venae cavae; C, right auricle; D, right ventricle; E, E', pulmonary artery and branches; F, F', pulmonary veins; G, left auricle; H, left ventricle; I, aorta; K, innominate artery; L, left carotid artery; M, left subclavian artery.

WHAT HEAT IS. Heat is supposed to be produced by the motions of the molecules of bodies. However close together these molecules may appear, they are not supposed to touch one another, and they are supposed to have a constant motion, called *vibration*. It is also supposed that all space, even that between the molecules, is filled with an immaterial and invisible substance, called *ether*. This ether conveys to other bodies the heat produced by the vibration of the molecules (See *ETHER*). When this vibration increases, the temperature of the body rises, and when it decreases, the temperature falls.

WHERE HEAT COMES FROM. The sun is the great source of heat. It warms the earth and all things on it. The stars also give off heat, but they are so far distant that we do not receive it. Mechanical action, such as rubbing bodies together, hammering them or compressing them into a smaller space, produces heat. Our hands are warmed by rubbing them together; a nail is made hot by hammering it; the barrel of a bicycle pump is warmed by the compression of the air while it is being forced into the tire of the wheel.

Chemical action, such as fire, produces heat. Fire is caused by the union of the oxygen of the air with the carbon in the fuel. The heat in our bodies is produced by the action of the blood and digestive fluids upon the food, and also by the action of the oxygen of the air upon the carbon with which it comes in contact in the lungs.

HOW HEAT TRAVELS. Heat travels in three ways: (1) By *conduction*. Heat travels by conduction when it passes from one part of a body to another part, without any noticeable movement in the body; such is the heating of a stove poker when one end of it is placed in the fire. If a silver spoon be placed in hot tea, the heat passes from the tea to the hand through the spoon; if placed in ice, the heat passes from the hand to the ice. Bodies through which heat passes readily by conduction, such as metals, are called good conductors; those through which it does not pass readily, such as wood, wool, fur and feathers, are called poor conductors. For this reason, iron tools are fitted with wooden handles; if used when hot, they do not burn the hand, and if used when cold, they do not conduct the heat away from the hand. Fur garments keep us warm, not because they produce heat, but because they prevent the heat of the body from passing off into the air.

(2) By *convection*. Heat travels by convection when it is carried by the circulation of the body itself; a good example is the warming of buildings by hot air from a furnace, or by hot water carried through pipes. This mode of carrying heat is also used for a number of other practical purposes.

(3) By *radiation*. Heat comes to us by radiation from the sun; also, from a grate, hot stove or the flame of a lamp. When it travels in this way, it always comes in straight lines and decreases in intensity as the distance from the source increases. That is, to be exact, the amount of heat varies inversely as the square of the distance from the source. If standing four feet from a fire you receive a certain amount of heat, you will receive only one-fourth that amount when eight feet away.

WHAT HEAT DOES. (1) *It makes bodies larger.* When a body is heated, it increases in size. If an iron bar, which exactly fits a hole in an iron plate, is heated, it becomes too large to pass through the hole. This increase in size is called *expansion*, and it can be easily seen by observing the liquid in a thermometer; as the temperature rises, the liquid expands and rises in the tube. The force which accompanies the change of size in bodies on account of heating and cooling is very great and is turned to a number of practical uses. Wagon tires are made just a little smaller than the rim of the wheel; they are then heated, when they become large enough to fit upon the wheel; as they cool, they contract and draw the parts of the wheel firmly together. Steel frames of buildings, the trusses of bridges and the plates of boilers are riveted with red-hot rivets; as the rivets cool, they draw the parts so firmly together that they make these structures very solid and strong. See **EXPANSION**.

(2) *It changes solids to liquids.* Ice is changed to water and metals become liquid when heated to a sufficient temperature. The temperature at which a substance changes from a solid to a liquid is called its *melting point* or *fusing point*. The melting point of most metals is very high.

(3) *It changes liquids and solids to vapor.* Some substances, such as camphor and zinc, when heated to a high temperature, take the form of vapor instead of liquid. When liquids are raised to the boiling point, they change to vapor, as boiling water changes to steam. The vapor occupies much more space than the liquid, and its expansive force is very great. In the

Heath

case of steam, this force is used in the operation of the steam engine.

(4) *It produces light.* When certain substances are raised to a high temperature, they give off light, as a white-hot iron, a glowing coal or a flame. All such substances radiate both light and heat, which come to us together, as in the rays from the sun.

Heath, *heath*, or **Heather**, *heth'er*, the popular name for many plants, most of which



HEATHS
Three species in blossoms.

belong to the same genus, and all of which belong to the heath family. They are widely distributed over Europe and the Mediterranean region, and are found most abundantly in South Africa. From 400 to 500 species are known, and twelve or fifteen of these are natives of Europe. Many of them bear flowers of brilliant color, and in certain sections the heather is a favorite and characteristic plant. Scotch heather has low, grayish, hairy stalks and broom-like branches, with needle-shaped leaves and sprays of countless, tiny, purple blossoms. In Scotland the poor use heather for thatching their houses, and in other European countries it is used in making brooms, brushes and bed mattresses. One species only of heather is found in the United States and that grows sparingly in a few localities on the Atlantic coast; but there are many American plants of the same family which are familiar, including, for instance,

Heating and Ventilation

the trailing arbutus, the huckleberry and the cranberry. In physical geography, the term *heath* is applied to a tract of low, level land covered with shrubs. The name originated in Great Britain, where it was first applied to land covered with the heath plant. Heaths are not common in America, and the term is seldom applied to areas in the United States.

Heating and Ven'tila'tion. The condition of the atmosphere in houses and public buildings is of such importance to health and vigor of mind, that heating and ventilation are receiving more and more attention as sanitary science is better understood. The lack of proper care has been the cause, and it is still responsible, for an incalculable amount of human disease and suffering. The temperature which is usually considered best in a room whose occupants are not engaged in any exercise varies from 68° to 70° Fahrenheit. Individuals may require higher temperature, but overheated rooms are responsible for much sickness in cold weather, because of the inevitable sudden changes experienced in passing in and out of doors. On the other hand, too low a temperature is injurious, especially to those who are sitting quietly.

Ventilation is a means of renewing the atmosphere in rooms and of maintaining its purity by driving out foul air and admitting fresh air without drafts. Carbonic acid gas, which is breathed from the lungs of all animals, is destructive of health if breathed again into the lungs. Moreover, the human breath pollutes the air with small quantities of ammonia and with organic matter, especially bacteria, and so tends to make the atmosphere not only unpleasant but dangerous for respiration. Authorities disagree in estimating the amount of pure air necessary for an adult, but it is generally admitted that not less than one thousand cubic feet of fresh air per hour should be allowed for each healthy person. Invalids require from three to four times as much. It is possible, of course, to secure change of air in a room very quickly by throwing open doors and windows, but the sudden change in temperature and the resulting drafts are dangerous to the occupants. Accordingly, in all living rooms some provision must be made for the removal of foul air and the introduction of fresh air. Heating and ventilation are so closely allied that they must be considered together.

One of the earliest methods of heating rooms was by the open fireplace, and this still remains

an excellent method, though the waste of heat is considerable. It was this waste, in fact, that led to the introduction of closed stoves, first made of earthenware and then of metal. These are now constructed in an infinite number of varieties and are commonly in use throughout America and in Europe. They do save fuel, but in so doing they have prevented the ventilation which fireplaces gave and are liable to overheat the rooms and render the air too dry. Other methods of heating are now generally in use. Air-tight furnaces, surrounded by jackets, connected by pipes with different parts of the building, from which return shafts bring foul air into the furnace proper, are very generally in use. In such cases a conduit from the open air leads a supply of pure air inside the jacket of the furnace. In other systems, steam and hot water are forced through pipes to all parts of buildings by heat, and this forms an effective way of warming the rooms, though a separate system of ventilation must be used to make either steam or hot water satisfactory. From their superior neatness and cleanliness, steam and hot water seem to be gradually displacing the hot air systems.

Proper heating and ventilation is one of the most serious problems that confronts the teacher in small schools. Usually large stoves are placed in the room, and these make the temperature too high for the children sitting near them before the air in the remote portions of the room is warm. Such stoves should be surrounded by a jacket of tin or sheet iron, reaching from the floor to a point some distance above the heads of the children. A pipe laid from the outer air, under the floor and through an opening beneath the stove, will give a supply of pure air which, as it is heated by the stove, will be forced up into the room. Provision should be made to carry away the foul air from near the floor in some part of the room distant from the stove. If it is impossible to have the stoves fitted up as described, a screen may be used to protect those sitting near the stove from the heat, and a supply of pure air may be admitted by fastening a board six or eight inches wide at the bottom of the window casing, so that it fits tightly into the space, and then raising the window about four inches. The air is then deflected upward and away from persons sitting in the room.

Heatstroke. See **SUNSTROKE**.

Heaven, *hev'n*, (probably signifying that which is *heaved* up, or elevated), in a physical

sense, the azure vault which spreads above us like a hollow hemisphere and appears to rest on the earth at the horizon. It is really the appearance presented to us by the immeasurable space in which the heavenly bodies move, and the azure color is due to the presence of particles of dust in the air. In theology, this word denotes a region of the universe where God's presence is especially manifested, in contrast with the earth. Among Christians the opinion has been that heaven is the residence of the Most High, the holy angels and the spirits of just men made perfect, that this abode is eternal and its joys intensely spiritual. The expression of Jesus, "The kingdom of heaven is within you," has led to the idea that heaven is a pure, spiritual condition of mind.

Heaves, *heevz*. See **BROKEN WIND**.

He'be, in Greek mythology, the goddess of youth and the cupbearer to the gods, a daughter of Jupiter and Juno and the wife of Hercules after he had been made a god. According to some accounts she gave up her office when she became the wife of Hercules; according to others, she was dismissed because she stumbled while serving the gods. She was succeeded by Ganymede. See **GANYMEDE**.

Hébert, *a bair'*, JACQUES RÉNE (1755-1794), a French journalist and politician, popularly known as Père Duchesne, from the revolutionary journal of that title which he founded at the outbreak of the Revolution. The radical opinions and violent language of this journal made Hébert popular with the people, and he was elected attorney-general of the commune and a member of the National Convention. As a member of the committee appointed to try Marie Antoinette, he increased her sufferings by the malicious and brutal charges which he brought against her. His violent methods were recognized by Robespierre as a menace to the cause of the Revolution, and he was accordingly put to death in March, 1794.

Hebrew Language and Literature, the language and literature of the Jews, Israelites or Hebrews at that period when they formed a compact nation inhabiting Canaan, or Palestine. The Hebrew language forms a branch of the Semitic family of languages, being akin to the Aramaic (Chaldee and Syriac), Arabic, Ethiopic and Assyrian. In the antiquity of its extant literary remains, Hebrew far surpasses the other Semitic languages, and in richness and development it is inferior to the Arabic only. The language is deficient in grammatical tech-

nicalities, especially in the inflection of nouns and verbs and in possessing no neuter gender. The alphabet is composed of twenty-two consonants, the vowels being expressed by marks above or below these letters. The accents and marks of punctuation amount to about forty. The writing is from right to left. There are three kinds of Hebrew alphabets now in use, the square, or Assyrian (properly called the Babylonian), the most common in print; the rabbinical, or medieval, and the cursive, or alphabet used in ordinary writing.

Extant Hebrew literature is almost entirely comprised in the Old Testament, which represents a period of at least one thousand years, from 1200 B. C., when some of the poetical portions, such as the song of Deborah in the fifth chapter of *Judges*, were already in existence, to 200 B. C., or later, when the book of *Daniel* and some of the *Psalms* were written. During this period the written language underwent surprisingly little change. In passing from the book of *Genesis* to the books of *Samuel* we do not recognize any very striking difference in the language. Even those who assert that the Pentateuch as a whole is of a comparatively late era admit the great antiquity of some of its contents, which do not differ in language from the rest. The writings which belong to the period following the Babylonish captivity differ from those which belong to the preceding age; the influence of the Aramaic or Chaldee language, acquired by the Jews in the land of their exile, greatly corrupted their tongue. Belonging to this age are the historical books of *Chronicles*, *Ezra*, *Nehemiah* and *Esther*. In the prophets who prophesied during and after the captivity, with the exception of *Daniel*, the Aramaic element is by no means so strong as we might expect, as their style was evidently formed on that of the older prophets. At what time Aramaic became the dominant element, it is impossible to determine, but by the time of the Maccabees it had become the spoken language. The fragments of the popular language in the New Testament are all Aramaic, and ever since that time the Hebrew proper has been preserved and cultivated only as the language of the learned and of books, and not of common life.

After the return from the captivity, the Jewish literature was carefully cultivated. Under *Ezra* the Scriptures were collected and arranged into a canon. The Pentateuch was publicly read, taught in schools and translated into Aramaic. The legal or religious traditions explanatory or

complementary to the law of Moses were collected and established as the oral law. These labors resulted in the *Midrash*, a general exposition of the Old Testament, divided into the *Halacha* and the *Haggada*. To the Maccabean era belong the Apocrypha (in Greek), various Greek versions of the Bible and several collections of prayers, poems and proverbs. To the succeeding epoch belong some celebrated doctors of law—Hillel, Shammai, Gamaliel and others; while the age following the destruction of Jerusalem (70 A. D.) witnessed the completion of the New Testament and the works of Josephus, written, however, in the Greek language. On being driven from their capital by the Romans, numerous schools were established by the Jews in which their language and literature were taught. Of these schools the most celebrated were those of Babylon and Tiberias. The *Mishna*, which contains the traditions of the Jews and interpretations of the Scriptures, is supposed to have been compiled in the latter part of the second or in the earlier part of the third century; and the rabbis of Tiberias and Babylon wrote numerous commentaries on it, which were at length collected into two separate works, the *Jerusalem Talmud*, completed about the end of the fourth century, and the *Babylonian Talmud*, about a century later, under the care of Rabbi Ashe. What was called the *Targums*—that is, Aramaic translations of portions of the Old Testament—belong partly to times earlier, partly to times later than this period. The Jews latterly adopted the languages of the various peoples among whom they happened to dwell, though they also wrote in classical Hebrew, as well as in the less pure form of the *Rabbinical* Hebrew, and Hebrew is the language of the synagogues to-day, except in the reform communities of America and Germany. It also serves as the medium of correspondence among Jews in different parts of the world. This language, however, is not the pure Hebrew of the Bible and synagogue. The most brilliant epoch of Medieval Jewish literature was during the time of the Moors in Spain. Of modern literature in the Hebrew language, there is little that is of general interest.

Hebrews. See **JEWS**.

Hebrews, THE EPISTLE TO THE, a book of the New Testament, concerning the authorship of which there is much doubt. Many claim it to be the work of Apollos, a Jew famed for his eloquence, but in the Scriptures it is attributed to Saint Paul. The place and date of

writing are not fixed. The letter is designed to help its readers, whoever they were, in avoiding the dangers which would lead them to forsake the faith in Christ. It shows oratorical power and sets forth Christ as the end and fulfillment of the law.

Hebrides, *heb're deez*, or **Western Islands**, a series of islands and islets off the west coast of Scotland; usually divided into the Outer Hebrides, of which the principal are Lewis, Harris, North Uist, Benbecula, South Uist and Barra, and the Inner Hebrides, Skye, Mull, Islay, Jura, Coll, Rum, Tiree and Colonsay. There are about four hundred islands in all, but only ninety are inhabited. They are divided between the counties of Ross, Inverness and Argyre. The islands are on the whole mountainous and abound in moss and moor. The climate, although humid, is mild. The soil is mostly poor, and agriculture, except in certain places, is very backward. Oats, barley, potatoes and turnips are almost the entire produce of the soil. Cattle rearing and fishing are the chief industries. Population, about 100,000.

He'bron (anciently Kirjath-arba, now El-Khalil), a town in Palestine, 21 mi. s. w. of Jerusalem. It lies in the narrow valley of Mamre, about 2800 feet above sea level. Hebron is one of the oldest of existing towns. It was the residence of Abraham and the patriarchs, and David was here crowned king of Israel. A mosque, called El-Haram, formerly a church, is alleged to stand over the tombs of Abraham, Isaac, Jacob, Sarah and Rebecca. The city fell into the hands of the Mohammedans under Saladin in 1187, and since then it has been considered a sacred spot by them. Population, about 19,500.

Hecate, *hek'a te*, an ancient Greek goddess, whose powers were various. She could bestow wealth, victory, wisdom, good luck and prosperity, and she shared with Apollo the power of purifying from sin. She was latterly confounded with other divinities, such as Ceres, Diana and Proserpina, and finally she became, especially, an infernal goddess, who was invoked by magicians and witches. Dogs, honey and eggs were offered to her at places where three roads met. She was often represented with three bodies or three heads and with serpents round her neck.

Heck'les or **Hackles**, an apparatus employed in the preparation of animal and vegetable fibers for spinning. It consists of a series of long metallic teeth, fixed in a wooden or metallic base, in several rows, alternating with one another at short distances apart. The material

is drawn through the heckles, which comb the fibers out straight and fit them for the operations that follow in their manufacture into yarn or thread.

Hec'la or **Hekla**, a volcano of Iceland, about 20 miles from the southwest coast. It is about 5000 feet in height and has several craters. The mountain is composed chiefly of basalt and lava and is always covered with snow. One of the most tremendous eruptions occurred in 1783, after which the volcano remained quiescent till September, 1845, when it again became active and continued, with little intermission, till November, 1846, to discharge ashes, masses of pumice stone and a torrent of lava. The last outbreak was in March, 1878.

Hec'tor, in Greek mythology, the son of Priam and Hecuba, the bravest of the Trojans, whose exploits are celebrated in the *Iliad*. Having slain Patroclus, the friend of Achilles, he was in turn killed by Achilles, and his body was dragged at the chariot wheels of the conqueror about the walls of the city. Priam afterward gained possession of it and gave it solemn burial. Hector is the most attractive warrior in the *Iliad*, and one of the finest episodes described therein is his parting from his wife, Andromache, before his last combat.

Hec'uba, of Phrygia, in Greek legend, the second wife of Priam, king of Troy, to whom she bore Hector, Paris, Cassandra, Troilus and other children. After the fall of Troy she was given as a slave to Odysseus, and, according to one form of the legend, in despair she leaped into the Hellespont.

Hedgehog, *hej'hog*, an insectivorous animal, common in Europe and parts of Asia and Africa.



HEDGEHOG

It is about nine inches long and is covered with short, sharp spines. By means of a special muscle it is able to roll itself up into a ball and

erect its spines, and in this form it can defy most of its enemies. The hedgehog has an elongated nose, short ears and numerous teeth. It usually frequents small thickets and feeds on fruits, roots, insects, birds and reptiles. The female bears four to eight young at a birth, the young soon becoming covered with prickles. In the United States the name hedgehog is often applied to the native porcupine.

Hegel, *ha'gul*, GEORG WILHELM FRIEDRICH (1770-1831), a German metaphysician who has profoundly influenced modern theological and philosophical thought. He was born at Stuttgart and was educated at the University of Tübingen, where he became a friend and colleague of the philosopher Schelling. Through Schelling's influence Hegel was received at the University of Jena, where he became a lecturer. After the Battle of Jena he was made director of the Nuremberg gymnasium and was later appointed professor of philosophy at Heidelberg, then at Berlin, where he became known as a prominent leader in German philosophical thought.

Hegel's attempt as a philosopher was to define the relation between the finite self and the universal self, or God. From childhood he had delighted in the apparent contradictions of life. As a philosopher he found in the contradictions of thought and experience the key to the interpretation of existence. For example, he found that the personal self is a conscious self only as it recognizes its relations to others; that is, as it becomes a social self. According to Hegel's belief, the experience of any given moment is in reality that of a succeeding moment in which the experience comes to our knowledge, for we are always conscious of that which is just past—never of the immediate present. In a like manner, happiness and virtue are known only in the conquest of their opposites, sorrow and vice. Our very life consists in the recognition and overcoming of these contradictions. We learn virtue in our antagonism with vice; we come upon knowledge in our actual struggle with all that would baffle and confuse. The more we project ourselves into the lives of others and the more we encounter and become victors in the never-ceasing conflicts that present themselves, the more fully do we realize our deepest self, that is, the one universal self, God, whose life consists in the personal conquest over the infinitely varying conditions which represent the sum total of experience and whose being is the unified whole of consciousness.

Hegel was appointed school counselor by the Bavarian government and was also made a member of the commission of education by the Prussian government, but his influence on education is due more to his philosophy than to his work while in these positions. While he did not write directly upon the science of education, the principles stated in his philosophy have been far-reaching in their effect on changing educational thought and systems. He attributed great importance to the family and state as factors of education, and he placed great stress upon authority in the instruction of children. He believed that the reasoning powers should not be developed too early, but that they should receive attention as soon as the child had acquired a good fund of knowledge through the senses. He also believed in the value of the classics as a source of culture. His most important works are *Logic*, *The History of Philosophy*, *Esthetics* and *Philosophy of Religion*. A good exposition of his doctrines is set forth in *The Logic of Hegel*, by William T. Harris.

Hegira, *hej'c rah* or *he ji'ra*, the term commonly used to indicate Mohammed's flight from Mecca, July 16, 622 A. D. The Caliph Omar instituted, in 639 or 640, a new Moslem calendar, to begin with the first day of the first month in which the flight took place. The Mohammedan year, as a lunar year, is shorter than ours by about eleven days. A rough and ready method for finding the year in our calendar corresponding to a given year in the Mohammedan is to subtract from the latter $\frac{1}{3}\frac{1}{3}$ of itself and add 622 to the remainder. As, 1324 of the Mohammedan calendar corresponds to 1906 ($1324 - 40 + 622 = 1906$). To find the precise year and day, multiply the year of the Hegira by 970,224, strike off from the product six decimal figures and then add 621.5774; this will give the year of the Christian era; the day of the year is obtained by multiplying the decimal figures by 365.

Heidelberg, *hi'del berK*, a town of northern Baden, situated on the left bank of the Neckar, in one of the loveliest districts of Germany, about 12 mi. s. e. of Mannheim and 55 mi. s. of Frankfurt. It stands on a narrow strip between the river and the castle rock, and it consists chiefly of one main street. The castle, begun in the end of the thirteenth century and exhibiting elaborate examples of early and late Renaissance architecture, is the most remarkable edifice in Heidelberg and one of the most famous structures in Europe. It is now an ivy-clad ruin, but it is carefully preserved from further decay; it stands

high above the town in the midst of a beautiful park. One of the greatest curiosities of the place is the Heidelberg tun, kept in a cellar under the castle. It is 36 feet in length, 26 feet in diameter and is capable of holding 800 hogsheads. Heidelberg is also famous for its great university, the oldest in Germany. The principal industry of the town is brewing. Population in 1900, 40,121.

Heidelberg University, one of the most renowned of German universities, founded at Heidelberg by Elector Rupert I in 1386. It was originally modeled after the University of Paris, and in the beginning it was a Catholic institution. After the Reformation it became strongly Calvinistic. In 1802 it was reorganized on a much larger scale, and since that time it has become famous. It maintains departments of theology, law, medicine and philosophy, which includes the arts and sciences. The library contains over 500,000 volumes and a large number of manuscripts. There are over 150 professors and instructors in the faculty, and the number of students is about 1500. This university is famous for the large number of American students enrolled.

Heilbronn, *hile bron'*, a town of Württemberg, Germany, situated on the Neckar, about 33 mi. n. e. of Stuttgart. Heilbronn was founded about 700, became a free city in 1360 and passed into the possession of Württemberg in 1802. The old portion of the town contains many places of historic interest, including some connected with the careers of Götz von Berlichingen, Schiller, Charles V and other famous characters. The city is now of industrial importance for its manufacture of chemicals, silver utensils, machinery, sugar and other products. It also has four fine harbors. Population in 1900, 37,891.

Heilprin, *hile'prin*, ANGELO (1853-1907), an American scientist and traveler, born in Hungary. He came to the United States when three years of age, but returned to Europe to complete his education, studying in London, Geneva and Vienna, where he made a specialty of natural history. On his return to the United States he was appointed professor of paleontology and geology at the Philadelphia Academy of Natural Sciences and occupied the position for sixteen years, during a portion of which time he was also executive curator of the cabinet. He was the first president of the Geographical Society of Philadelphia. During his connection with the Academy of Natural Sciences, Professor Heilprin made numerous journeys to Florida, Bermuda

Islands and Mexico in the interests of his department, and he thoroughly investigated the geology of each of these regions. He ascended a number of the highest volcanoes in America, including Orizaba and Popocatepetl. He led the Peary relief expedition in 1892, and in 1902 he acquired wide celebrity through his investigation of the eruption of Mount Pelee in Martinique, ascending the volcano while it was in a state of eruption. Professor Heilprin has been a prolific writer. Among his best-known works are *The Geographical and Geological Distribution of Animals*, *Principles of Geology*, *The Earth and Its Story* and *Alaska and the Klondike*. He was also chief editor of a revised edition of Lippincott's *Geographical Gazetteer*.

Heimdall, *hime'dal*, in Scandinavian mythology, the son of Odin, who kept watch on the rainbow bridge over which the gods passed from Asgard, their home, to the earth. His sight and hearing were more acute than those of mortals, and nothing could evade his vigilance.

Heine, *hi'na*, HEINRICH (1797-1856), a German poet and author, born of Jewish parents at Düsseldorf. He studied law at Bonn, Berlin and Göttingen; took his degree at the last-mentioned place, and allowed himself to be baptized that he might obtain a license to practice. His revolutionary tendencies and his open admiration for Napoleon made him exceedingly unpopular in Germany, and by 1830 it had become practically impossible for him to live there. He removed, therefore, to Paris, where he was very well received and where he lived until his death.

Heine's first published work was his *Poems*, which appeared in 1822. Although many of these surpassed in lyric beauty anything in German literature, they attracted comparatively little attention. His most famous prose work, the *Harzreise*, appeared in 1826, and this was afterward combined with *Norderney*, *Das Buch Le Grand* and *Die Bäder von Lucca* in the *Reisebilder* (Pictures of Travel). The *Buch der Lieder* (Book of Songs) contains his collected lyrics. During his last years, when helpless with paralysis, he continued to produce his wonderful melodious songs, satires and humorous pieces. Heine's is the greatest name in German literature since Goethe. The delicacy and melody of his lyrics, the raillery, the graceful, glancing wit of his *Reisebilder*, have never been approached.

Heintzelman, *hine'tsel man*, SAMUEL PETER (1805-1880), an American soldier, born in Lancaster County, Pa., and educated at West Point.

He served on the frontier, took part in several indian wars and in the Mexican War and at the outbreak of the Civil War became brigadier general of volunteers. He participated in the Peninsula Campaign, was promoted to become major general of volunteers and later was made brevet brigadier general. He was at one time in command of the defenses at Washington, in 1864 was commander of the Department of the West and was retired in 1869 with the rank of major general.

Heir, *air*, in law, one to whom the property of a deceased person passes. In America it denotes those to whom the *real* property descends, not by will, but only when the will is lacking (See DESCENT; WILL). In other countries, however, the term is used more broadly, to include all who have rights to property of a deceased person, either through will or by the natural laws of descent. See REAL PROPERTY; PERSONAL PROPERTY.

Hek'la. See HECLA.

Hel, *hale*, in Norse mythology, the daughter of Loki, the goddess of the dead, who dwelt beneath one of the three roots of the ash Yggdrasil. Dark rivers surrounded her abode, and a dog watched without. She herself, in the guise of a woman of half black and half fair complexion, was supposed to ride about on a three-footed horse. She was often to be propitiated by an offering of oats.

Hel'der, a fortified seaport of the Netherlands, in the most northern part of the Province of North Holland, opposite the island of Texel and commanding the entrance to the Zuyder Zee. From a fishing town Napoleon converted it into a fortress and naval station of the first rank and called it his "northern Gibraltar." Being much exposed, the port and coasts are protected by gigantic dikes, one of which is 6 miles long and built entirely of Norwegian granite. In 1673 a famous naval battle occurred off this point between the combined fleets of France and England on one side, and the Dutch fleet under Van Tromp and De Ruyter, on the other, the latter being successful. Population in 1900, 25,159.

Helen, in classical legend, the most beautiful woman of her age, the daughter of Jupiter and Leda and the sister of Castor and Pollux. By the advice of Ulysses, her numerous suitors had bound themselves by oath to respect her choice of a husband and to avenge any injury done to her or to her husband through her. When, therefore, after her marriage with Menelaus, she

was carried off by treacherous Paris, her former suitors fulfilled their vow and set forth against Troy, the city of Paris. On the death of Paris, Helen was married to his brother, Deiphobus, but after the end of the struggle she was again received by Menelaus and they returned to Sparta, where they ruled in peace until the death of Menelaus. According to most legends Helen was afterwards murdered at Rhodes.

Hel'ena, ARK., the county-seat of Phillips co., 95 mi. e. of Little Rock, on the Mississippi River and on the Saint Louis, Iron Mountain & Southern and other railroads. The city has an extensive trade and contains lumber and cottonseed oil mills, foundries and other factories. One of the battles of the Civil War occurred here, July 4, 1863, between a Union army under General Prentiss and a Confederate force under General Holmes. The city has a public library, an excellent Federal building, Jefferson High School and Sacred Heart Academy. Population in 1900, 5550.

Helena, MONT., the capital of the state and the county-seat of Lewis and Clarke co., 73 mi. n. e. of Butte, on the Great Northern and the Northern Pacific railroads. The city has a picturesque location and is surrounded on all sides by the Rocky Mountains. The Montana Wesleyan University is located here, and the city has public, state and other libraries. Among the other important structures are the Federal building, the state capitol, the courthouse, the high school, Saint John's Hospital and several fine churches. There are extensive gold, silver and iron mines in the vicinity, and the city contains machine shops, smelters and flour and lumber mills. The place was settled as a mining camp in 1864 by four despondent prospectors who had named the gulch "Last Chance" and had vowed to give up their hunt for gold if they found nothing at this place. The first panful of gravel washed out \$20 in coarse gold, and during the next six years \$15,000,000 were taken out of this camp. Helena has been the capital of the state since 1869. Population in 1900, 10,770.

Helgoland, *hel'go lahnt*, or **Heligoland**, an island belonging to Germany, in the North Sea, about 40 mi. from the mouth of the Elbe. It is 1½ miles long and ½ mile broad, and the highest point is 200 feet. Its rocks, of reddish sandstone, present a perpendicular face to the sea, but they are being rapidly eaten away by the waves. The island produces potatoes, barley and oats, but oysters and lobsters are the chief products. It is much frequented as a bathing resort. In

ancient times it was held in veneration and was sacred to the god Fosite. The inhabitants, of Frisian descent, are mainly fishers, pilots and lodging-house keepers. Helgoland was captured by Great Britain from Denmark in 1807 and became a German possession in 1890, in exchange for a portion of what is now British East Africa. Population in 1900, 2307.

Hel'ian'thus. See **SUNFLOWER**.

Hel'icon, a mountain range of Greece, in the west of Boeotia, in one sense a continuation of the range of Parnassus. It was the favorite seat of the Muses, who, with Apollo, had temples here. In it, also, were the fountains of Aganippe and Hippocrene. The highest summit is more than 5000 feet in altitude.

Hel'igoland. See **HELGOLAND**.

Heliograph, *he'le o graf*, or **He'liostat**, a name given to various contrivances for reflecting the sun's light, either temporarily or continuously, to an observer at a distance. The simplest heliograph is a mirror hung up at a distant station so as to reflect a flash to the observer whose station may be many miles from it. This mirror is generally so adjusted that the flash occurs exactly at some prearranged hour, and by being in readiness the observer can get an observation with precision as regards time. Some heliographs are visible for 80 miles. By being fitted with an adjustment of clockwork, the mirror can be made to revolve with the sun and to reflect a beam of sunlight steadily in one direction. An instrument with this attachment is often called a *heliotrope*. The heliograph has been used for signaling in war, and it is employed by the United States coast and geological surveys in measuring long distances by triangulation.

He'liop'olis (City of the Sun), the Greek name of an ancient city, called variously On, Ramesses or Beth-shemesh, in the Hebrew Scriptures, and now called Matarich. It is situated a little north of Memphis and was one of the most ancient and extensive cities of Egypt under the Pharaohs. During the flourishing ages of the Egyptian monarchy, the priests taught within its temples, and both Eudoxus and Plato visited its famous schools. Here Joseph and Mary are said to have rested with the infant Christ. Near the village stands the Pillar of On, supposed to be the oldest Egyptian obelisk, 67½ feet high and 6 feet broad at the base. The obelisks known as Cleopatra's needles, of which one is in New York, formerly stood here.

He'lios, in Greek mythology, the god of the sun, son of Hyperion and Theia, and brother of Aurora. He was supposed to dwell in the ocean behind Colchis, from which he issued in the morning and to which he returned at night. His worship was widespread, and he had temples in Corinth, Argos, Troezen, Elis and Rhodes, the Colossus of which was a representation of Helios. He was later confounded with Apollo.

He'liostat. See **HELIOGRAPH**.

Heliotrope, a genus of plants. The members of the species are herbs or undershrubs, mostly natives of the warmer parts of the world. The common heliotrope is native to the south and west of Europe; it has small white or pale red flowers, with a fruit of four drupes, under a thin, fleshy covering. A South American species is a very fragrant garden plant, growing to about two feet in height and bearing small lilac-blue flowers.

Heliotrope or **Bloodstone**, a variety of quartz, partaking of the character of jasper or of chalcedony. It is of a deep green color and is covered with red spots. It is hard and is used for burnishers; the finely-marked stones are prized for seals, signet rings and other ornaments. They are found in Tartary, Persia, Siberia, in the island of Rum, Scotland and elsewhere. It received the name *heliotrope*, or *clitropia*, because it was said that if the mineral were put into water in a basin, rubbed with the juice of the plant heliotrope and exposed to the sun, the water would appear red and the sun blood-like, as if it were eclipsed. The stone rubbed with the juice of the plant was said to render its wearer invisible. See **PRECIOUS STONES**, *color plate*.

Hel'ium, the name given to a chemical element found in small quantities in the atmosphere, from which it is separated during the manufacture of liquid air. Helium is a gas, and it is next to hydrogen in lightness, is only slightly soluble in water and is chemically inactive. It is regarded only as a laboratory curiosity.

Hell signified originally the covered or invisible place. In the English Bible the word is used to translate the Hebrew *sheol* (grave or pit) and *Gehenna* (properly, the valley of Hinnom), as well as the Greek *Hades* (the unseen). In the Revised Version of the New Testament, however, hell is used only to translate *Gehenna*, *Hades* being left where it stands in the Greek. In common usage hell signifies a place or con-

dition of suffering of the wicked after death. Christian sects differ in their opinions as to the length and kind of punishment. Different ones declare that bodily torture is inflicted; that the fire in hell means only that the unrighteous are purified; that the suffering is eternal; that the suffering lasts only till the soul is purified. The Eastern and Western churches are at one as to the punishment of hell being partly "a pain of loss," that is, the consciousness of being debarred from the presence of God, and partly a "pain of sense," that is, real physical suffering. See GEHENNA; HADES.

Hel'las and Hellenes, *hel'leenz*. See GREECE.

Hel'lebore, a genus of perennial, low-growing plants, with leathery leaves and yellowish, greenish or white flowers. The black hellebore of the ancients, produced from the roots, is a violent poison, but it has some medicinal value when used in small quantities. The Greeks thought it would drive away sadness and make the mind clear and bright. White hellebore is a very different plant, belonging to the lily family.

Heller, STEPHEN (1814-1888), a Hungarian musician, born in Budapest. He began his studies in his native city and continued them at Vienna, where he made his *début* as a pianist in 1827. Two years later he began a successful concert tour through Europe. Soon after, he fell ill and was adopted by a wealthy family of Augsburg, through whose kindness he continued his studies. He went to Paris, where he associated with Chopin, Liszt and Berlioz and became well known as a pianist. His compositions are not regarded so highly, but they are filled with original themes and beautiful melodies. He was the author of numerous studies and exercises for the piano, which have become very popular.

Hel'espont. See DARDANELLES, THE.

Hell Gate, the name given to a pass in East River, between Long Island and Manhattan Island and between Long Island and Ward's Island. The pass is a portion of the strait which connects New York Bay with Long Island Sound. The reefs of rock in the main passage formerly made the pass very dangerous, on account of the currents and eddies caused by the rising and falling tides. By extensive undermining and blasting these obstructions were removed by the government in 1885.

Helmet, an article of armor to protect the head. It is a development of the open head-

dress of early times. Homer represents his heroes wearing bronze helmets with lofty crests. Helmets were common also among the Romans, but they did not have protection for the face. In the Middle Ages they were made of steel and provided with bars and flaps for protection in battle. They were made in various styles, some having a *beaver*, or movable piece, and some a *visor*, which could be lowered to protect the eyes but allowed the wearer to see through small slits. The modern military helmets afford no protection for the face.

Helmholtz, *helm'hohltz*, HERMANN VON (1821-1894), a German physiologist and physicist, born at Potsdam and educated at Berlin. In 1848 he became professor of anatomy at the Academy of Fine Arts, Berlin, and in the next year he obtained the chair of physiology at Königsberg, from which he was successively transferred to the same post at Bonn and later at Heidelberg. In 1871 he was appointed professor of physics at Berlin, and through his efforts Berlin became the greatest center in the world for the study of physics through experiment. His work was chiefly in those departments of physics which are in closest relation with physiology, notably in acoustics and optics. Of his many publications the best known are *The Conservation of Force*, *Manual of Optics*, *Popular Lectures on Scientific Subjects* and *Sensations of Tone as a Physiological Basis for the History of Music*.

Heloise, *a lo eez'*. See ABELARD.

He'lots, slaves in ancient Sparta. They were the property of the State, which alone had the disposal of their life and freedom and which assigned them to certain citizens, by whom they were employed in private labors. Agriculture and all mechanical arts at Sparta were in their hands, and they were also obliged to bear arms for the State in case of necessity. They behaved with great bravery in the Peloponnesian War and were rewarded with liberty (431 B. C.), but two thousand appear to have been subsequently massacred. They rose against their masters several times, but were finally completely subjugated.

Hel'singborg, a seaport in Sweden, opposite the Danish city of Elsinore. It contains manufactures of sugar, salt, machinery, leather and chemicals and carries on a heavy trade with Denmark. It has a spacious harbor. Population in 1901, 24,670.

Hel'singfors, a seaport of Russia, capital of the grand duchy of Finland and of the Gov-

ernment of Nyland, 191 mi. n. w. of Saint Petersburg. It has manufactures of linen, sailcloth and tobacco and an important trade in timber, corn and fish. It is beautifully situated on a broad peninsula and has one of the best harbors in the Baltic Sea. It is second only to Cronstadt as a naval station. Helsingfors has many fine buildings, broad, attractive streets and good educational institutions. Population in 1900, 93,217.

Helvetii, anciently a Gallic or Celtic nation, dwelling in the country corresponding nearly to modern Switzerland. They were not much known to the Romans until the time of Julius Caesar, who, as governor of Gaul, prevented their intended emigration and after many bloody battles pressed them back within their frontiers. After their subjection by Caesar, several Roman colonies were established among them. On the death of Nero, the Helvetii, for refusing to acknowledge Vitellius as emperor, were mercilessly punished by Caecina, one of his generals, and thenceforth they almost disappeared as a people.

Hem'ans, FELICIA DOROTHEA (1793-1835), an English poet. She first appeared as an author at the age of fifteen, with a volume entitled *Early Blossoms*, which was followed some years later by her more successful volume, *The Domestic Affections*. Other volumes of her poems are *The Forest Sanctuary*, in which appeared *Casabianea*, *Hymns for Childhood* and *Scenes and Hymns of Life*. Her poetry is essentially lyrical and is always sweet, natural and pleasing.

Hem'atite, a name applied to two ores of iron, red hematite and brown hematite. They are both of a fibrous structure, and the fibers, though sometimes nearly parallel, usually diverge or even radiate from a center. They occur in abundance in both igneous and stratified rocks. The red hematite is a variety of the red oxide and is one of the most important iron ores. The brown hematite is a variety of the brown oxide or hydrate; its streak and powder are always of a brownish yellow. See IRON.

Hem'enway, JAMES A. (1860-), an American lawyer and politician, born at Boonville, Ind. He was admitted to the bar in 1885, and from 1895 to 1905 was a member of the House of Representatives. In the latter year he was elected United States Senator from Indiana to succeed Vice-President Charles W. Fairbanks.

Hemip'tera, a large family of insects, which includes those usually called bugs, known as most destructive to crops and as loathsome pests to humanity. Lice, bedbugs, chinch bugs and scale insects are all Hemiptera. The young do not resemble the parents very closely, but the metamorphosis is incomplete. The mouths of all these insects are adapted for sucking, and they live upon the blood of animals or the juices of plants. See INSECTS, and the special articles on various insects.

Hemisphere, *hem'is feer*, half a sphere, especially one of the halves into which the earth may be supposed to be divided. It is common to speak of the Eastern Hemisphere and the Western Hemisphere, the former, also called the Old World, comprising Europe, Asia, Africa and Australia, with their adjoining waters and islands; the latter including North America and South America. The boundary between the two is quite arbitrary, and a more natural division of the earth is into the Northern and the Southern hemispheres, the equator forming the dividing line. Some geographers also divide the earth into land and water hemispheres.

Hemlock, a poisonous biennial of the parsley family, which grows a shining, hollow stem, usually marked with purplish spots and elegant leaves, which are much divided and which, when bruised, give a nauseous odor. The flowers are small white clusters in large umbels. Hemlock grows in Great Britain and throughout Europe and in temperate Asia; it has long been known because of its medicinal and poisonous properties. It is supposed that the poison given to Socrates was a decoction of this plant, though it may have been the water hemlock which was used in this case. The hemlock grows in ditches and other moist places, seldom reaching a height of more than a foot. It now grows in many places in the United States.

Hemlock or **Hemlock Spruce**, a large, graceful tree, not unlike some of the spruces in appearance. The leaves, which are not more than half an inch long, are bright green above and silvery white below. They are not set so closely on the branches as are those of the spruces, and, consequently, they give a more graceful appearance to the twigs and branches. The cones are small and open. The wood of the hemlock is not especially valuable, but the bark is used in large quantities by tanneries. In recent years the deple-

Hemp

tion of the pine forests has led to a greater use of hemlock lumber. The trees grow in forests



HEMLOCK SPRUCE

throughout the Northern United States, west as far as Minnesota and south to Alabama and Georgia.

Hemp, a plant belonging to the nettle family and extensively cultivated for the fibers found in its stalk. The plant has a coarse, rough stem, which grows to the height of from four to nine feet. The leaves are large and are composed of five or seven narrow, toothed leaves, each from three to five inches long. The stamens are borne on one plant, in large clusters of flowers near the top. The pistils, which are inconspicuous, are borne on another plant. The hemp fiber is tough, strong and peculiarly adapted for the manufacture of coarse fabrics, ropes and other forms of cordage.

After the ground is prepared, the seed is sown evenly over it, from one to two bushels to the acre being used. Care must be taken to spread the seed evenly or the plants will grow of different sizes, and from such a crop it is impossible to obtain good, even fibers. The plant is harvested and the fiber is prepared for market in practically the same way that flax is har-

Henderson

vested and prepared (See FLAX), the difference being such as is due to the larger size and greater strength of the hemp plant. The fibers are long, soft and strong. They can be bleached as white as linen and woven into coarse fabrics, such as toweling and sheeting, carpets and rugs; but a large proportion of the fiber is employed in the manufacture of ropes and cordage.

Hemp is raised in large quantities in Russia, Brazil, Italy and several other tropical countries. Kentucky and some of the other Southern states of the United States raise small quan-



HEMP

Snowing seed, seed vessel and flower.

ties, while the Philippine Islands are noted for the production of this plant, which forms one of their most important exports. A variety of hemp known as *Henequin* is extensively raised in Central America. See SISAL.

Hemp, INDIAN. See HASHISH.

Hen. See FOWL.

Hen'derson, Ky., the county-seat of Henderson co., on the Ohio River, 10 mi. below Evansville, Ind., and on the Louisville & Nashville, the Illinois Central and other railroads. The city is a very important tobacco market. It also has a large trade in corn and wheat and contains tobacco factories, planing mills, coal mines and manufactories of cotton and woolen goods, hominy, furniture, wagons and other

Henderson

articles. The place has large wealth, fine public school buildings and a well-equipped sanatorium. Other features of interest are the magnificent bridge across the river, the city fair grounds and Atkinson Park, covering 100 acres. Henderson was one of the first settlements on the Ohio River, but was not incorporated until 1797. Population in 1900, 10,272.

Henderson, DAVID BREMNER (1840-1906), an American legislator, born at Old Deer, Scotland. In his sixth year he came to America and was educated in the public schools of Iowa and in Upper Iowa University. When the Civil War broke out he enlisted as a private and became lieutenant of his company, but in 1863 he was discharged from the army on account of a severe wound. The following year, however, he reentered the army as colonel of an Iowa regiment. After the close of the war he studied law and was admitted to the bar at Dubuque, where he practiced for several years. In 1882 he was elected to the national House of Representatives; in 1894 he became chairman of the judiciary committee, and on the retirement of Thomas B. Reed he was chosen speaker of the House. He declined a renomination to Congress in 1902.

Hendricks, THOMAS ANDREWS (1819-1885), an American statesman, vice-president of the United States, born near Zanesville, Ohio. He was taken in infancy to Indiana, where he was educated in the public schools, was graduated at South Hanover College and was admitted to the bar. He served in the legislature, and he was in Congress from 1851 to 1855. He was elected to the Senate in 1863 and was pronounced in his support of the Union. In 1868 he was a candidate for the Democratic nomination for president; in 1872, Greeley having died, many electoral votes were given to Hendricks. In the same year he was elected governor of Indiana. In 1876 he was nominated by the Democratic party for the vice-presidency, was again a candidate in 1884, and was elected. He died in the following year.

Hen Hawk or Chicken Hawk, a name given to a number of different species of hawks, who either attack poultry or are supposed to do so. In some instances, for example, in the common marsh hawk, the name is very unjustly applied. The *red-tailed hawk* captures small poultry and birds, but they doubtless form a small part of this bird's food. The gophers, mice, frogs and many injurious small animals which are eaten by this hawk render it probably

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on the whole beneficial. The *red-shouldered hawk* never attacks poultry, although often accused of doing so. It does prey upon mice and other injurious animals and is really a good friend of the farmers. Some of the smaller hawks are called chicken hawks, and though they doubtless occasionally do some damage, yet they do not altogether deserve the dislike of poultry raisers.

Henley Regat'ta, a famous rowing contest held at Henley-on-Thames in the month of July of each year. It lasts for three days and is marked by a brilliant gathering from all parts of the United Kingdom and even from foreign lands. The races are open to all amateurs. The course is a little less than one mile and one-third in length and is rather narrow. Fine prizes are given to the winners. The Henley Regatta is the most famous rowing contest in the world.

Hen'nepin, LOUIS (about 1640-1706), a Belgian missionary and explorer in America. He accompanied La Salle's last expedition to the upper Great Lakes, but left him after the founding of Fort Crevecoeur on the Illinois River, and continued to the Mississippi with a few followers. There Hennepin was captured by the Sioux and taken to the head waters of the Mississippi River, or to about the site of the present city of Minneapolis. He returned to France, was again ordered to America, but refused to go and fled to Holland. After the death of La Salle he made extravagant claims of discovery and exploration which have been proved utterly false.

Henry, a frequent name of European monarchs. Among them may be mentioned Henry I (about 1008-1060), *king of France* (See also HENRY II; HENRY III; HENRY IV; of France); *Holy Roman emperors*, Henry I (See HENRY I, king of Germany), Henry II (about 973-1024), Henry V (1081-1125) and Henry VII (?-1313) (See also HENRY III; HENRY IV; HENRY VI; *Holy Roman emperors*). See also HENRY I; HENRY II; HENRY III; HENRY IV; HENRY V; HENRY VI; HENRY VII; HENRY VIII; of England.

Henry I (1068-1135), king of England, the youngest son of William the Conqueror. He was hunting with William Rufus when that prince was killed, in 1100, and instantly riding to London, he caused himself to be proclaimed king in the absence of his elder brother Robert, duke of Normandy. He reestablished by charter the laws of Edward the Confessor and married Matilda, daughter of Malcolm III of Scotland,

thus conciliating the Scots. Robert landed with an army, but was pacified with a pension and the promise of succession in event of his brother's decease. Soon after, however, Henry invaded Normandy, took Robert prisoner and reduced the duchy. He was successful also in a struggle with France. The last years of his reign were troubled. In 1120, his only son, William, was drowned. Three years later, a revolt occurred in Normandy in favor of Robert's son. The Welsh also were a source of disturbance. Henry appointed as his heir his daughter Matilda, or Maud, whom he had married first to the emperor Henry V and then to Geoffrey Plantagenet of Anjou.

Henry II (1133-1189), king of England, the first of the Plantagenet line, the son of Geoffrey, count of Anjou, and Matilda, daughter of Henry I. He succeeded Stephen. The opening of his reign was marked by the reduction of the powerful nobles and the reorganization of the financial system. The most important events of his reign were the submission of the Church to the temporal authority of the Crown, through the Constitutions of Clarendon, the famous struggle with and murder of Thomas à Becket, resulting in the restoration of some ecclesiastical rights, the conquest of Ireland; the first subjugation of Scotland by England, and the division of England into four judicial districts, with itinerant justices appointed to make regular excursions through them. Henry ranked among the greatest of English kings, his chief services to his people being the revival of trial by jury, the construction of roads and the destruction of castles of lawless barons. Henry's sons greatly disturbed the latter part of his reign with their insurrections.

Henry III (1207-1272), king of England, son of John, whom he succeeded in 1216. As Henry approached manhood he displayed a character wholly unfit for his station and a weakness which proved the opportunity of the great barons of the country. These, under Simon de Montfort, revolted and succeeded in forcing Henry, by the Provisions of Oxford, to resign the chief power to a committee of the barons. In later years, Edward, son of the king, defeated the barons and freed his father from his early humiliating promises. Parliament, in its modern sense of two houses, was first called during this reign.

Henry IV (1367-1413), king of England, first king of the House of Lancaster, the eldest son of John of Gaunt, fourth son of Edward III. He ascended the throne in 1399 on the abdication

of Richard II. The first six years of his reign were filled with a series of insurrections, which were finally quelled, and the rest of the reign was comparatively untroubled. The first persecutions of the Lollards occurred during the rule of Henry IV.

Henry V (1387-1422), king of England. On succeeding his father, Henry IV, in 1413, he showed a wisdom in marked contrast to a somewhat reckless youth. The struggle in France between the factions of the dukes of Orleans and Burgundy afforded Henry a tempting opportunity for reviving the claims of his predecessors to the French crown. He accordingly landed near Harfleur in August, 1415, and though its capture cost him more than half his army, he decided to return to England by way of Calais. A large French army endeavored to intercept him at the plain of Agincourt, but was completely routed (October, 1415). He returned in triumph to England, but on the defeat of his brother, the duke of Clarence, in Normandy, he again set out for France, drove back the army of the dauphin and entered Paris, forcing Charles VI to accept him as his successor to the French crown. A son was at this time born to him, and all his great projects seemed about to be realized, when he died of fever at Vincennes.

Henry VI (1421-1471), king of England, became king on the death of his father, Henry V, in 1422. As he was an infant, his uncle John, duke of Bedford, was appointed regent of France; and his uncle Humphrey, duke of Gloucester, was made protector of England. A few weeks after Henry's succession Charles VI of France died, and in accordance with the Treaty of Troyes, Henry was proclaimed king of France. The war which followed proved at first favorable to the English, but in the end, through the heroism of Joan of Arc, the death of the duke of Bedford and the defection of the duke of Burgundy, it resulted in the loss to the English of all their possessions in France, except Calais. In April, 1445, Henry married Margaret of Anjou, daughter of René of Provence, and the marriage was very unpopular in England. Other causes increased this unpopularity, and various risings ensued, which led in 1455 to the opening of the Wars of the Roses (See *ROSES, WARS OF THE*). During the struggle Henry was several times taken prisoner by the Yorkists, and in 1471 he was found dead in the Tower, murdered, according to popular belief, by order of Edward IV. Henry was a gentle, pious, well-intentioned, hopelessly incompetent king.

Henry

Henry VII (1456–1509), king of England, first sovereign of the race of Tudor. He was proclaimed king in 1485, after the defeat and death of Richard III at Bosworth. His reign was troubled by repeated insurrections, of which the chief were headed by Lord Lovel and the Staffords, and by the impostures of Lambert Simnel and Perkins Warbeck. In the main, however, the period was beneficial to England. Its freedom from wars permitted the development of the internal resources of the country, and Henry's policy of curbing the power of the feudal nobility was highly salutary. For a time, however, the loss of power by the aristocracy gave an undue preponderance to that of the Crown.

Henry VIII (1491–1547), king of England, succeeded his father, Henry VII, in 1509. After the election of Charles V to the German Empire both Charles and the French king, Francis I, sought the alliance of England. A friendly meeting took place between Henry and Francis at the "Field of the Cloth of Gold" (1520), but the interest of Charles preponderated. Henry withdrew from the struggle between France and the emperor, however, when he found that he was being used as a tool. Meanwhile came the determination of the king to divorce his wife Catharine, who was older than he, had borne him no male heir and had, moreover, been in the first place the wife of his elder brother. The last of these points was the alleged ground for seeking divorce, though Henry was probably influenced largely by his attachment to Anne Boleyn, one of the queen's maids of honor. The pope refused to grant a divorce, and Henry eagerly caught at the advice of Thomas Cranmer, afterward archbishop of Canterbury, to refer the case to the universities, from which he soon got the decision that he desired. In 1533 his marriage with Catharine was declared null, and an anticipatory private marriage with Anne Boleyn declared lawful; and as these decisions were not recognized by the pope, two acts of Parliament were obtained, one in 1534 setting aside the authority of the chief pontiff in England, the other in 1535, declaring Henry the supreme head of the Church. Henry suppressed the monasteries by act of Parliament, and thereby inflicted an incurable wound upon the Catholic religion in England. It was far from being his intention, however, to advance the cause of Protestantism in England, and he insisted on firm adherence to the tenets of the Roman Catholic Church. The fall of Anne Boleyn in 1536 was unfavorable for a time to the reformers.

Henry

Henry then married Jane Seymour, and the birth of Prince Edward, in 1537, fulfilled his wish for a male heir. The death of the queen was followed by Henry's marriage with Anne of Cleves, the negotiations for which were conducted by Cromwell. The king's dislike for his wife, which resulted in another divorce, was extended to the minister who had proposed the union, and Cromwell's disgrace and death soon followed. A marriage with Catharine Howard proved no happier, and she was executed on a charge of infidelity. In 1543 Henry married his sixth wife, Catharine Parr, a lady secretly inclined to the Reformation, who survived the king. In the meantime Scotland and France had renewed their alliance, and England became again involved in war. James V ravaged the borders, but was defeated at Solway Moss in 1542, and in 1544 Boulogne was captured, Henry having again allied himself with Charles V. Charles, however, soon withdrew, and Henry maintained the war alone until 1546. Henry died in 1547 and was succeeded by his son, Edward VI.

Henry II (1519–1559), king of France, son of Francis I, whom he succeeded in 1547. Calais, which the English had held for centuries, came into French possession during his reign, but in the struggle with Philip II, Henry was not so fortunate, meeting with severe defeats and being forced to sign an unfavorable treaty at Cateau-Cambrésis. Henry's wife was Catharine de' Medici.

Henry III (1551–1589), king of France, third son of Henry II and Catharine de' Medici, came to the throne on the death of his brother, Charles IX, in 1574. The war against the Huguenots, which had been begun in the previous reign, continued under Henry III, who was at length forced to grant to the Protestant party certain concessions. This led to the formation of a Catholic League, in response to whose demand Henry repealed the special privileges of the Huguenots, thus bringing on another war. The Huguenots, under Henry of Navarre, were successful, and to their camp Henry III fled, after he had made himself unpopular with the Catholic party by his murder of the duke of Guise and the cardinal of Lorraine, the Catholic leaders. In 1589 Henry III was murdered, and Henry of Navarre came to the throne as Henry IV.

Henry IV (1553–1610), king of France, better known as Henry of Navarre, the son of Anthony of Bourbon, duke of Vendôme, and of Jeanne d'Albret, queen of Navarre. Educated by his mother in the Calvinistic faith, he early joined,

Henry

at her wish, the Protestant army of France and served under Admiral Coligny. In 1572 he married Margaret of Valois, sister of Charles IX, and after the massacre of Saint Bartholomew's Day, which took place during the marriage festivities, he was forced to adopt the Catholic creed. In 1576 he escaped from Paris, retracted at Tours his enforced statement of Catholicism, put himself at the head of the Huguenots and took a leading part in all the subsequent religious wars. On becoming presumptive heir to the crown, through the death of the brother of Henry III, he was obliged to resort to arms to assert his claims. In 1587 he defeated the army of the League at Coutras, and after the death of Henry III, in 1589, he gained the battles of Arques and Ivry. He was obliged, however, to raise the siege of Paris; and convinced that a peaceful occupation of the throne was impossible without his professing the Catholic faith, he became nominally a Catholic in 1593.

After his formal coronation in 1594 only three provinces held out against him—Burgundy, reduced by the victory of Fontaine-Francaise in 1595; Picardy, reduced by the capture of Amiens in 1596, and Brittany, which came into his hands in the spring of 1598. The war against Spain was concluded in 1598 by the Peace of Vervins, to the advantage of France. The same year was signalized by the granting of the Edict of Nantes, which secured to the Protestants religious liberty. Henry made use of the tranquillity which followed to restore the internal prosperity of his kingdom, and particularly the wasted finances, in which he was aided by his prime minister, Sully. At the instance of Sully, Henry divorced Margaret of Valois, and in 1600 he married Maria de' Medici, niece of the grand duke of Tuscany, mother of Louis XIII. She was crowned in 1610, but on the day following her coronation Henry was stabbed by a fanatic named Ravaillac, while examining the preparations for the queen's entry into Paris. The great benefits which Henry IV bestowed upon France entitled him to the designation which he himself assumed—the Regenerator of France.

Henry I, called the *Fowler* (876-936), king of Germany, was chosen king on the death of Conrad I in 919. The most important event of Henry's reign was the struggle with the Hungarians, to whom, for a time, he paid tribute. At length, feeling strong enough to refuse this, Henry met the invading Hungarians and completely defeated them.

Henry

Henry III (1017-1056), Holy Roman emperor, became king of Germany on the death of his father in 1039 and succeeded to the imperial dignity in 1046. He strengthened his power by forcing Hungary, Bohemia and Apulia to render him homage, and in 1046 he deposed the pope and appointed a new one. From this time to the end of his reign his influence was strong in all Church matters. He was one of the most powerful of the early emperors.

Henry IV (1050-1106), Holy Roman emperor, came to the throne on the death of his father, Henry III, in 1056. After some years of regency, Henry assumed the rule himself and found that much of the power in the kingdom had been usurped by the nobility and the Church. A formidable revolt of the Saxons was put down in 1073, and Henry was able to give his attention to a struggle with the pope. The two came into conflict owing to a decree promulgated in 1075 forbidding civil rulers to appoint to any ecclesiastic office, a decree which Henry refused to obey. The result was that Henry called a council and deposed the pope, and was in turn excommunicated. The pope released Henry's subjects from their allegiance, and this forced Henry to the point of making peace with the pope after most humiliating concessions. In 1080 the pope again excommunicated Henry, who laid siege to Rome and appointed an anti-pope. A short time afterward he was driven out of Italy. In 1105 he was compelled by his nobles to abdicate.

Henry VI (1165-1197), Holy Roman emperor, son of Frederick Barbarossa. He served as regent while his father was in the Holy Land, and in 1190 he succeeded to the crown on his father's death. Through his wife he laid claim to the throne of Sicily, and this involved him during much of his reign in wars in Italy. When Richard I of England was captured, on his return from the Holy Land, it was to Henry that he was handed over for safe keeping. Among the early emperors of Germany Henry ranks as one of the strongest.

Henry, JOSEPH (1799-1878), an American scientist, born at Albany, N. Y., and educated in the Albany Academy. At an early age he began a series of experiments in electricity and was the first to construct an electro-magnetic telegraph, which as a sounding telegraph has never been improved. He also invented the first machine moved by electro-magnetic force. In 1831 he sent signals over wire more than a mile in length and showed in this and other

Henry

experiments the practical use of the telegraph, several years before this invention was made public by Samuel Morse. The next year Henry was chosen professor of natural history in the College of New Jersey and held that position for fourteen years, when he became the first secretary and manager of the Smithsonian Institution. The usefulness and greatness of that institution are to a large extent due to Professor Henry (See SMITHSONIAN INSTITUTION). He organized the meteorological bureau, which later was transferred to the government as the weather bureau. In his later life he was made president of the lighthouse board, and in the next few years he laid the foundation of our present lighthouse system. Among his publications, most of which are in the form of articles in scientific periodicals and in the New York reports of the Smithsonian Institution, is one of especial value, *Contributions to Electricity and Magnetism*.

Henry, PATRICK (1736-1799), an American orator and patriot, born in Virginia. Henry received a brief classical education, but at an early age entered business and married at eighteen. Having failed successively in "store-keeping" and in farming, he became a lawyer in 1760, and three years later, having been employed to plead the cause of the people against an unpopular royal enactment (See PARSON'S CAUSE), his great eloquence placed him at once in the front rank of American orators. His bold and unflinching opposition to the Stamp Act and the policy which it expressed, during which he is said to have uttered the famous words, "Give me liberty or give me death," led to his election as delegate to the First Continental Congress. He delivered the first speech in that assembly, and it was worthy of so momentous a meeting. In 1776 he carried the vote of the Virginia convention for independence; and in the same year he became governor of the new state. He was afterward four times reelected. In 1791 he retired from public life and in 1795 declined the office of secretary of state, offered him by Washington. Henry was rather eloquent than deep; no one who has come after him has been able to stir and sway the passions of an audience as easily as he; yet he was not a statesman of broad views or of especial foresight.

Henry the Navigator (1394-1460), son of John I of Portugal. From time to time he sent vessels on voyages to the coasts of Barbary and Guinea, and one of these voyages resulted in the discovery of the Madeira Islands. In 1433 one of his navigators safely doubled Cape Bojador,

Hepburn

and other adventurers, pushing still farther south, discovered Cape Blanco and Cape Verde. A profitable commerce with the natives of West Africa was soon developed, and the Senegal and Gambia were partially explored. Henry's efforts not only laid the foundations of the commerce and colonial possessions of Portugal, but gave a new direction to navigation and commercial enterprises.

Henschel, hen'shel, GEORG (1850-), a German-English musical composer and singer, born at Breslau, of musical parentage. He entered Leipzig Conservatory in 1867 and later studied in Berlin. He soon established a reputation as a singer and was chosen to take one of the principal rôles in Gluck's opera *Iphigenia en Tauride*. He went to England in 1877 and settled in London, where he soon attained fame as a teacher. In 1881 he married a young American soprano, Miss Lilian Bailey. For three years thereafter he conducted the Boston Symphony Orchestra. He composed several songs, operas and orchestral pieces, of which the most important is the *Stabat Mater*.

Henty, GEORGE ALFRED (1832-1902), a writer of juvenile fiction. He received his education at Cambridge and engaged in newspaper correspondence for the London *Standard* during the Austro-Italian and the Franco-German wars. The stirring quality and wholesome interest of his best stories have won for him unusual popularity with boys. Among his best known works are *Under Drake's Flag*, *The Lion of the North*, *By Pike and Dyke*, *With Lee in Virginia* and *In Freedom's Cause*.

Hepatica, a beautiful little flower that blossoms in earliest spring. The hairy stalks rise from the midst of the leathery, dark-colored, three-lobed leaves, that have lain on the ground during the winter. The flowers, which are related to the buttercups, vary in color from white to red and purple. The hepatica is sometimes known as the liverleaf or liverwort.

Hepburn, WILLIAM PETERS (1833-), an American politician, born at Wellsville, Ohio. In 1841 he was taken to Iowa Territory, where he was admitted to the bar in 1854. He served in the Union army during the Civil War, becoming captain, major and lieutenant colonel of a volunteer regiment. In 1881 he was elected a member of Congress and again in 1893 and was several times reelected. As chairman of the committee on interstate and foreign commerce in 1906, he was sponsor for an important bill for the regulation of railroad rates.

Hep'tarchy, the name given to the seven kingdoms into which England is supposed to have been divided in Anglo-Saxon times. The kingdoms were founded at different times, and at no one time were they all independent monarchies. In 827 King Egbert of Wessex united all the kingdoms into one and assumed the title of king of England.

He'ra. See JUNO.

Her'aldry, the whole science of a herald's duties, or, more commonly, the knowledge of the forms, terms and laws which pertain to the use of armorial bearings or coats of arms. Badges and emblems on shields, helmets and banners naturally were used in the earliest times, and the symbols were sometimes hereditary. The origin of heraldic arms is, however, to be attributed to the necessity which arose during the Crusades of distinguishing the leaders of the numerous and motley bands of warriors that constituted the Christian armies. The rules of heraldry now practiced at the Heralds' College are comparatively modern and differ in some respects from those of other European courts. A coat of arms consists of the figure of a shield, marked and colored in a variety of ways, so as to be distinctive of an individual, a family or a community. The shield, or escutcheon, represents the original shield used in war, on which arms were anciently borne.

Herat, *her aht'*, a city in the northwest of Afghanistan, the capital of a province of the same name, about 370 mi. w. of Cabul. The most important manufactures are carpets, sword blades, shoes, cloaks and sheepskin caps. The trade, almost entirely in the hands of Hindus, is greatly favored by the situation of the town on the great thoroughfare from India westward. Herat was probably founded by Alexander the Great, and since that time, besides being occasionally independent, it has been under the control of the Arabs, the Persians and the Afghans at different times. Population, about 45,000; it was formerly much greater.

Herba'rium, a collection of dried plants, arranged in order, according to a recognized system of classification. The plants are usually mounted on sheets of white paper, and a good specimen shows the leaf, root, flower and fruit. In the United States there are three great collections, besides numerous smaller ones in several colleges and museums. The United States national herbarium, which is in the National Museum; the herbarium of the New York Botanical Garden, and the Gray Herbarium in

Harvard University are the largest collections, each rich in its own peculiar way. In the herbarium of the Jardin des Plantes of Paris, there are a great many of the type specimens from which our American plants were named.

Herbart, *her'bahrt*, JOHANN FRIEDRICH (1776-1841), a German philosopher, born in Oldenburg and educated at the University of Jena, where he was a pupil of Fichte. Herbart early manifested an interest in philosophy, and while a student at Jena he became an ardent follower of Fichte, though later he rejected the system of his instructor and formulated one of his own. He became connected with the University of Göttingen, where, with the exception of a few years spent at Königsberg, he remained during his life.

According to Herbart, all ideas originate from what he styled *monads* or *reals*, which he considered as metaphysical atoms. These he believed were back of the world of known phenomena, of which they were the active metaphysical cause. These reals were simple in quality, possessed the power of self-preservation against all disturbances from other reals and were capable of creating disturbances in one another. The soul is one of these reals, its seat is in the brain and it is in close relation with a multitude of other reals. Whenever an excitation upon the remote end of nerves leading to the brain is made, the nerves convey this impression, and it reaches the soul through the medium of the reals most closely related to it. According to this idea the soul of itself is incapable of development; ideas arise only from interaction or conflict with these reals. When they become prominent, they are in consciousness, but it is impossible for the soul to have all the ideas it contains in consciousness at any one time. The prominence of ideas depends upon their ability to assist or contradict one another. When the contradiction of two is equal, there is no idea as to the result of the conflict. When two ideas are closely related, each strengthens the other and the new idea is more prominent than either of the original ideas. Herbart abolished the idea of separate mental powers and believed that the development of the soul depended entirely upon its coming in contact with the external world.

Herbart's educational principles are based directly upon his philosophy and psychology. He believed that all subjects were related and that the knowledge of one strengthened the knowledge of all others. He was also the originator of the doctrine of apperception (See APPER-

CEPTION). His entire system of pedagogics leads to the idea that the end and aim of education is the development of the individual, whom he places above family or state in his system. Herbert is the founder of modern pedagogics, and his psychology and pedagogy have exerted a powerful influence in modifying the methods of instruction and courses of study in Germany, England and the United States. His pedagogical works have been translated into English, and the most useful of them are easily obtained. Consult De Garmo's *The Psychology of Herbert* and *Herbert and the Herbartians*. See also PEDAGOGICS; PSYCHOLOGY.

Herbert, hur'burt, HILARY ABNER (1834-), an American politician, born at Laurensville, S. C. He was taken in infancy to Greenville, Ala., was educated at the University of Alabama and the University of Virginia and admitted to the law. He served in the Confederate army during the Civil War, and was disabled at the Battle of the Wilderness. From 1877 to 1893 Herbert was a member of Congress, where he was connected with the committee on naval affairs, and he served during the second administration of President Cleveland as secretary of the navy, after which he resumed the practice of law at Washington.

Herbert, VICTOR (1859-), an Irish-American musician, born at Dublin, Ireland; the grandson of Samuel Lover, a famous novelist. At seven years of age he began the study of music in Germany and eventually became an excellent performer upon the 'cello, securing an engagement as first 'cellist of the court orchestra at Stuttgart. In 1886 he accepted a similar position with the Metropolitan Orchestra of New York. He was chosen the successor of Gilmore as leader of the famous Twenty-second Regiment band and later accepted the conductorship of the Pittsburg Orchestra. He is the author of numerous songs and pieces for the piano and orchestra, besides several well-known comic operas, of which the best are *The Ameer*, *The Idol's Eye*, *The Fortune Teller*, *The Singing Girl*, *Babette*, *Babes in Toyland* and *It Happened in Nordland*.

Herbicides, hur'bi sidez, the name given to any preparation for destroying weeds. Among the herbicides most commonly used, and apparently with greatest success, are solutions of carbolic acid, copper sulphate, arsenic, sal soda, kerosene and salt. The amount of the preparation to be used depends upon the conditions and habits of growth of the weeds. Recent bulletins of the department of agriculture at Washington

give full information as to the best methods of eradicating weeds.

Herbs, urbz or hurbz, plants that contain no woody tissue. They usually die down to the ground at the end of their growing season. Many of them are used in the preparation of foods and medicines, especially for spices. Among the best known are parsley, sage, thyme, marjoram and caraway.

Her'cula'neum, an ancient city, about 5 mi. s. e. of Naples, at the base of Mount Vesuvius. It was completely buried, with Pompeii, Stabiae and other villages, by lava and ashes during an eruption of Vesuvius in the reign of the Roman emperor Titus, 79 A. D. The site had been long sought in vain, when, early in the eighteenth century (1709, 1713 or 1718), statues were found in the digging of a well at the village of Portici. In 1738 the well was dug deeper, and traces of the theater of Herculaneum were found. Later explorations have disclosed wonderful examples of ancient art, far excelling those found at Pompeii.

Hercules, hur'ku leez, the most celebrated among the Greek heroes or semi-divine persons.



HERCULES AND THE NEMEAN LION

He was the son of Jupiter by Alcmena, a mortal princess, and was brought up at Thebes at the court of his step-father. Juno, hating him because of Jupiter's love for his mother, troubled him throughout his career with all the disasters she could invent. When he was but eight months old, she sent two gigantic serpents to devour him, but the child, stretching out his hands, grasped them by the neck and strangled them both. When he grew to manhood he married and settled down to a happy life. Juno, however, determined that he should know no peace and afflicted

him with madness, so that he killed his three children and wandered forth as an outcast. As a purification for his crime he was condemned to serve his cousin Eurystheus and to perform any tasks which might be laid upon him. The tasks which he accomplished were what are known as the Twelve Labors of Hercules. They were (1) to kill a lion which ravaged Nemea; (2) to destroy the hydra (See HYDRA); (3) to capture alive and unhurt a stag, famous for its incredible swiftness, its golden horns and brazen feet. In this he succeeded only by driving the animal into a far northern snowdrift from which it could not extricate itself; (4) to capture alive a furious wild boar; (5) to clean the stables of Augeas (See AUGIAS); (6) to kill the savage birds which troubled the country near the lake Stymphalus in Acadia and ate human flesh; (7) to bring alive to Eurystheus a prodigious wild bull which laid waste the island of Crete; (8) to obtain the mares of Diomedes (See DIOMEDES); (9) to procure for the daughter of Eurystheus the girdle which had been given by Mars to the queen of the Amazons; (10) to kill the monster Geryon and bring to Eurystheus his numerous flocks; (11) to obtain three golden apples from the garden of the Hesperides (See HESPERIDES); (12) most dangerous of all, to bring up from Hades Pluto's dog, Cerberus. All of these tasks he performed, besides many others which he met with while on his enforced journeys. After his release from Eurystheus he came into conflict with Apollo and was by him condemned to serve as a slave to Omphale, queen of Lydia. The occupations of Hercules during this period were exceedingly effeminate. In female garb he worked at spinning, while his mistress clad herself in his lion's skin and brandished his famous club. Released from the Lydian queen, he again set out in search of adventures; having married Deianira, he was now no longer alone in his wanderings. One day Hercules and Deianira came to a rapid stream. The centaur Nessus offered to carry Deianira across, but when he reached the opposite shore, instead of setting her down he galloped off with her. Hercules therefore shot him with one of his poisoned arrows, and Nessus, with his dying breath, bade Deianira to dip in his blood a robe of Hercules, which should serve, if ever his love wandered from her, to bring him back. When sometime later she became jealous of Iole, she innocently sent Hercules the robe. Its effect, however, was most agonizing, and all attempts of Hercules to tear it off were in vain. As the only way of stopping the

pain, he had a huge funeral pile built, on which he laid himself. This was set on fire, but while the mortal part of the hero was consumed, Jupiter took the immortal part to Olympus, and there Hercules lived with the gods as the husband of Hebe.

Hercules, **PILLARS OF**, the ancient name for the rocks projecting into the sea on either side of the Strait of Gibraltar at its narrowest point. See GIBRALTAR.

Hercules Beetle, an enormous beetle, about five inches in length, found in Brazil. Its great peculiarity consists in the exceedingly long, curving horn which projects from the upper part of the head of the male, and the shorter one from the lower part of the head, which curves upward to meet it.

Heredity, the transmission from parent to offspring of physical and intellectual characteristics. The term is used in a very broad sense and applies to both plants and animals, though the greatest interest is attached, naturally, to heredity in human beings. Darwin, Spencer and Wallace have studied the subject thoroughly and embodied their discoveries in doctrines which, though at first received with skepticism, are now generally believed. It is known that heredity manifests itself in different ways. For instance, the qualities of the parents may blend in the children; they may alternate in the children; the qualities of one parent only may be transmitted to a child, or the inherited qualities may come from an ancestor—not the immediate parent. Both mental and physical characteristics are transmitted, but they do not necessarily manifest themselves in infancy; in fact, many hereditary traits come only with increasing age. To how great an extent an individual is governed by hereditary traits is still a question of discussion among scientists.

Heresy. See HERETIC.

Her'etic, one who holds some theological doctrine that conflicts with the beliefs of the church to which he belongs, but who, at the same time, calls himself a Christian. Many of the early Christians preserved their Jewish or Greek philosophical notions and mingled them with the doctrines of Christianity. Even in the time of the apostles there are traces of the Gnostics; and subsequently a great variety of heretical sects arose. Among religionists stigmatized as heretics in later times by the Roman Catholic Church were the Waldenses, the Wycliffites, the Hussites, the Lutherans and all Protestant sects and churches. Before Chris-

Herkimer

tianity was made the religion of the Roman state, nothing but excommunication was inflicted upon the heretic; but severe laws were passed soon after the conversion of the emperors. The code of Justinian contains many ordinances against heretics, and the canon law made it a duty to denounce them under pain of excommunication. Spain, Italy and France, from the thirteenth to the sixteenth centuries, suffered much from the persecution of heretics, but the states of Germany showed greater moderation. In England the burning of heretics was practiced before 1200 and continued for a long period. Heresy is now left entirely to the decision of the ecclesiastical authorities, and punishment can extend to excommunication only.

Herkimer, *hur'kim ur*, N. Y., the county-seat of Herkimer co., about 25 mi. e. of Utica, on the Mohawk River and the Erie Canal and on the New York Central railroad. The village is in a dairying region; its industries include the manufacture of knit goods, furniture, paper, beds, cigars and other articles. It is the seat of Folts Mission Institute. Population in 1905, 6596.

Herkimer, NICHOLAS (1715-1777), an American revolutionary soldier, born in Herkimer County, N. Y. At the outbreak of the Revolutionary War he was made colonel of militia, was promoted to be brigadier general and commanded an expedition against the Tory-indian forces of western New York. In 1777 with 800 men he marched to relieve Fort Stanwix, which was besieged by Saint Leger, with an English force, and Sir John Johnson with a Tory-indian force. When about six miles from the fort, Herkimer was ambushed, but after a desperate hand to hand conflict, known as the Battle of Oriskany, he compelled the British to retreat, with probably a loss of one-half the total force engaged. The American loss was one-third. Herkimer was mortally wounded.

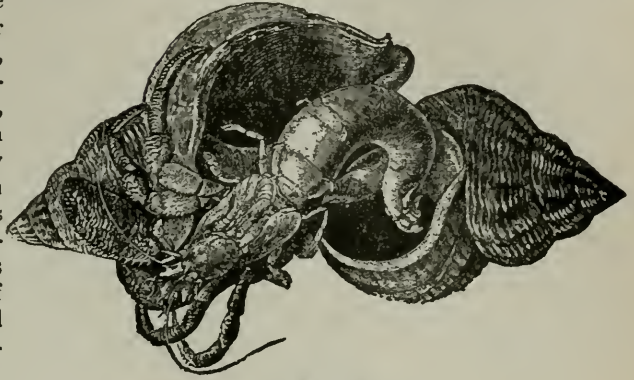
Hermes, *hur'meez*. See MERCURY.

Hermit Crab, *hur'mit krab'*, a name common to a family of well-known crustaceans. These crabs take possession of and occupy the cast-off shells of various mollusks. The crab carries its habitation about with it. The shell is changed for a larger one as the crab increases in size, and the crab attaches itself so firmly to the inside of the shell, by means of small hook-like append-

Hernia

ages, that it is impossible to draw it out without tearing its body. There are several species of various sizes, chiefly belonging to tropical shores.

Hermits are those who in early ages withdrew from association with man and took up their



HERMIT CRAB

abode in caverns or poorly made huts, in order to avoid the cares, temptations and business of the world. They often lived in complete solitude. The first hermit is said to have been Paul of the Thebaid, who fled to the desert after persecution by Decius and lived alone for ninety years, till his death, about 342. The hermits of the early church lived in a community, but each had a separate hermitage, and they met only at certain times for religious exercises.

Hermon, *hur'mon*, a mountain of Syria, on the border of Palestine, belonging to the Anti-Lebanon range. It is about 9400 feet high. The lower slopes are covered with vegetation, and the summit is usually crowned with snow throughout the year.

Hermosillo, *air'mo see'lyo*, a city of Mexico, the capital of the State of Sonora. It is situated on the river Sonora, 90 miles north of the port of Guaymas, with which it has a large traffic. It has a mint, distilleries and flour mills. Population in 1900, 17,618.

Herne, JAMES A. (1840-1901), an American actor and author, born in Troy, N. Y. He made his stage debut at the age of nineteen, in his native city, in *Uncle Tom's Cabin*. His first original play was *Hearts of Oak*, which appeared in 1878. His greatest success was *Shore Acres*, as produced at the Boston Museum in 1892. It achieved instant popularity and brought its author fame.

Hernia, *hur'ne ah*, or **Rupture**, in surgery, a tumor, formed by the protrusion of parts of any organ by a natural or accidental opening from

the cavity in which it is contained. The brain, the heart, the lungs and most of the abdominal viscera may become totally or partially displaced and thus give rise to the formation of hernial tumors. The term is ordinarily applied to abdominal hernia, which may arise from violent strain, as in jumping or lifting. Various forms of abdominal hernia are recognized, and each has its peculiar method of treatment. The wearing of a truss or support to hold the organ in its natural position is a common and safe remedy for the less severe cases.

He'ro, a priestess of Venus at Sestos, on the coast of Thrace, for love of whom Leander, a youth of Abydos, swam every night across the Hellespont, guided by a torch in her tower. He was at length drowned in the attempt, and his body was washed ashore. Hero, overcome with anguish, threw herself from the tower on the corpse of her lover and perished.

Her'od, called *The Great*, (about 62-4 B. C.), king of the Jews, was a native of Ascalon, in Judea. Julius Caesar appointed Herod to the government of Galilee, and after the Battle of Actium, Augustus, to whom he paid court, confirmed him in his kingdom. He rebuilt the Temple at Jerusalem with great magnificence and erected a stately theater and amphitheater in that city. Herod's policy and influence gave a great temporary splendor to the Jewish nation, but he was also the first to shake the foundation of the Jewish government, by dissolving the national council and by appointing the high priests and removing them without regard to the laws of succession. The birth of Jesus Christ is said to have taken place in the last year of Herod's reign.

Herod Agrip'pa I, a king of Judea, grandson of Herod the Great. For his attachment to Caligula he was imprisoned by Tiberius, but on the accession of Caligula (37 A. D.) he received the government of part of Palestine and latterly all the dominions of Herod the Great. To please the Jews, with whom his rule was very popular, he caused Saint James to be put to death and imprisoned Saint Peter. He died in 44 A. D., under the circumstances related in *Acts* xii, 20-23.

Herod Agrippa II, son of Herod Agrippa I and the last of the Herodian line. As he was, on his father's death, too young to govern, Judea was reduced to a Roman province. He subsequently received the kingdom of Chalcis and the superintendency of the Temple at Jerusalem, where, with his sister Berenice, he heard the defense of Paul before Festus. Being driven from Jerusalem by the revolt of the Jews, he joined the Ro-

mans and during the siege of Jerusalem was very serviceable to Titus.

Herod An'tipas, son of Herod the Great, by his Samaritan wife, Malthace, was appointed tetrarch of Galilee on his father's death, about 4 B. C. This was the Herod who put to death Saint John the Baptist, at the request of his unlawful wife, Herodias. He was in Jerusalem at the time of the crucifixion, and Jesus was sent to him by Pilate. Herod went to Rome, where he was accused of being in league with the Parthians and was banished, in consequence, to Lyons, in Gaul, where he died in 39 A. D.

Herod'otus (about 484-about 424 B. C.), the oldest Greek historian whose works have come down to us, the "father of history," was born at Halicarnassus, in Asia Minor. Before writing his history he traveled extensively, visiting the shores of the Hellespont and the Euxine, Scythia, Syria, Palestine, Babylon and Ecbatana, Egypt as far as Elephantine and other parts of northern Africa, everywhere investigating the manners, customs and religion of the people, the history of the country and the productions of the soil. On returning home he found that Lygdamis had usurped the supreme authority in Halicarnassus and had put to death the noblest citizens, among others, the uncle of Herodotus. Herodotus sought an asylum in the island of Samos. Having formed a conspiracy with several exiles he returned to Halicarnassus and drove out the usurper, but the nobles who had acted with him immediately formed an aristocracy more oppressive than the government of the banished tyrant, and Herodotus withdrew to Athens. Later he went to the recently founded colony of Thurii in Italy, where he seems to have spent most of the remainder of his life. Here he completed his great history of the contest of Greece with the East, culminating in the defeat of Xerxes.

Her'on, the common name for the group of graceful wading birds which live in swamps and along shallow rivers. They are very numerous, and different species are found almost all over the globe. They are easily distinguished by their long bills, cleft beneath the eyes; their slender, compressed bodies; their long, slender, naked legs; three toes in front, the two outer united by a membrane, and by their moderately long wings. Their tails are short, rounded and compressed. With their powerful necks and sharp, strong beaks, herons are able to strike fierce blows. Many of the species have long, ornamental crests and handsome plumes on the throat and body. Though not handsome in flight, because of their

Heron of Alexandria

habit of stretching their long legs straight out behind them and curling their heads between their shoulders, they are really graceful and elegant in their movements on land. The *snowy heron*, living along the Gulf of Mexico, but some-



SNOWY HERON

times straying farther north, is a handsome bird with pure white plumage and black legs and bill. The *great blue heron* is common in the United States, where it is noticed as a very shy bird which nests even to the extreme north. See BITTERN; EGRET; NIGHTHAWK; STORK.

Heron of Alexandria. See HERO OF ALEXANDRIA.

Hero of Alexandria or **Heron of Alexandria**, a Greek mathematician and physicist, the dates of whose birth and death are unknown. It is probable that he lived in the first or second century B. C. His work is not much more definitely known than are the facts of his life, but it seems probable that he wrote at least thirteen works, which dealt with different phases of mathematics and physics. It is also believed that he invented several mechanical devices, among which is the fountain which bears his name.

Herrera, air ra'rah, FRANCESCO (1576-1656), one of the greatest painters of the Seville school. He was born at Seville and studied under Fernandez, who painted in the Italian style. But Herrera early freed himself from this influence and adopted a style of his own. He designed with great spirit and vigor and may justly be regarded as the founder of a new national school of Spain. His subjects are of a religious nature and are usually somber and severe. His *Last*

Herring

Judgment is a masterpiece of design and coloring. Equal praise is due to his *Holy Family* and the *Outpouring of the Holy Spirit*. He also displayed much skill in fresco painting and bronze work.

Herrick, ROBERT (1591-1674), an English poet, educated at Cambridge. He was given the vicarage of Dean Prior in Devonshire, but in 1647 was forced by the Long Parliament to give it up. The first collections of his poems, *Hesperides* and *Noble Numbers*, appeared in 1648. After the Restoration he was given his old living, where he remained until he died. Herrick's poems, which are rhythmical and full of fancy, were highly praised on their publication, but for over a century after his death little attention was shown them. From the early nineteenth century, their popularity has been increasing. Among the most famous of his poems are *Gather ye rosebuds while ye may* and *Cherry Ripe*.

Herrick, ROBERT WELCH (1868-), an American author, born in Massachusetts. He was graduated from Harvard University, taught English in the Massachusetts Institute of Technology and later became professor of rhetoric in the University of Chicago. The scenes of the most of his novels, among which are *The Web of Life*, *The Real World*, *The Common Lot* and *Memoirs of an American Citizen*, are laid in Chicago.

Herring, a family of sea fishes, the most important of which is the common herring. It is of wide distribution in the North Atlantic, extending as far south as 45° north latitude.



HERRING

The herring measures from ten to twelve inches in length. It is blue-green on the back and its under parts are of a brilliant silvery white. It has small teeth in both jaws, and is of an elegant shape, the body being much compressed. It was formerly supposed that herrings migrated in two great shoals every summer from the polar seas to the coasts of Europe and America, returning in the winter, but the migration is probably only from a deeper part of the ocean to a shallower. The feeding ground of the herring is probably the mud deposits found in the deeper parts of the sea, and it seems to be a fact that during their visits to the shallower

waters of the coast, for the purpose of spawning, they do not feed, or at least feed very little. In summer the herring leaves the deep water where it has passed the winter and spring months, and seeks the coast, where it may deposit its eggs to be exposed to the influences of oxygen, heat and sunlight, which are essential to their development. These schools are generally followed by multitudes of hakes and dogfishes, and gulls and other sea birds hover over the shoals. The herring swim near the surface and are therefore easily taken by net. The number of eggs deposited by these fishes is almost incredible, as many as 68,000 having been counted in the roe of one female. Herring, without any apparent cause, often desert parts of the coast where for a time they have been remarkably abundant, not returning in large numbers till after the lapse of a number of years. Such seems to be the case on eastern coasts.

The American species differs somewhat in its external appearance from the common European species. It varies in length from twelve to fifteen inches; the color above is deep blue, tinged with yellow, with silvery sides and lower parts. The mode of fishing for herring is by drift nets. The fishing is carried on only in the night, the most favorable time being when it is quite dark and the surface of the water is ruffled by a breeze. Though not extensively used in the United States, the herring is considered the most important food fish in the world. The so-called herring of the Great Lakes belongs to the salmon family.

Herschel, *hur'shel*, JOHN FREDERICK WILLIAM, Sir (1792-1871), an English astronomer, educated at Eton and Cambridge. His first work was in higher mathematics, but later he began astronomical investigations and continued work in astronomy until his death. The important work of his life was the complete telescopic survey of the heavens, which he completed in Cape Town, where he spent four years. He counted 68,948 stars in 2299 different fields of observation. Among his writings are *A Treatise on Sound*, *A Treatise on the Theory of Light*, *Preliminary Discourse on the Study of Natural Philosophy* and *Outlines of Astronomy*.

Herschel, WILLIAM, Sir (1738-1822), an English astronomer, born in Hanover, Germany. He began his career as a teacher of music, but had his attention attracted to astronomy, to which he applied himself enthusiastically. While observing what he supposed to be a comet, he discovered a new planet, and this discovery won

him the position of private astronomer to George III. Among his important additions to the science of astronomy was the discovery of Uranus and six satellites and two satellites of Saturn. His sister, Caroline Lucretia (1750-1848), was his constant assistant, and she, too, made various discoveries, among them several nebulae and clusters of stars.

Hervey, *hur'vy*, **Islands**. See COOK ISLANDS.

He'siod, one of the oldest poets of Greece, probably belonging to the eighth century B. C. Little is known of his life, although it is known that he was one of the class of wandering singers. Of numerous works attributed to him there remain only the *Theogony*, a collection of the oldest fables concerning the birth and achievements of the gods; the *Shield of Hercules*, a fragment of a larger work, and a didactic poem, *Works and Days*, which treats of agriculture and the choice of days for the performance of certain tasks, with prudential precepts concerning education, domestic economy and similar subjects.

Hesperides, *hes per'e deez*, in Greek mythology, certain nymphs whose duty it was to guard the golden apples belonging to Hera. In their charge they were assisted by a dragon. The garden where these apples grew was of rather uncertain locality, but Hesiod places it in an island of the ocean far to the west. It was the eleventh labor of Hercules to kill the dragon and bring the golden apples of the Hesperides to Eurystheus. See HERCULES.

Hesperor'nis, a fossil bird found in the chalk formation of Kansas. It is about six feet long, without wings; its jaws are armed with teeth, which are not set in sockets, but in a common groove. It has been described as "a kind of swimming, loon-like raptorial ostrich, without fore limbs, with the gape armed with formidable rows of strong teeth, like a gigantic lizard, and with a large, broad and flattened tail like a beaver."

Hesperus. See EVENING STAR.

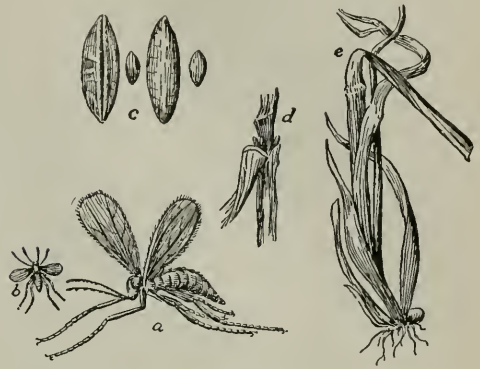
Hesse, *hes*, GRAND DUCHY OF, formerly known as Hesse-Darmstadt, a state of Germany, consisting of two distinct, and a number of minor, divisions. Of the two main portions, one, forming the provinces of Rheinhessen, on the left, and Starkenburg, on the right, bank of the Rhine, lies immediately to the north of Baden; the other, Oberhessen (Upper Hesse), is entirely enclosed by the Prussian province of Hesse-Nassau. Darmstadt is the capital of the grand duchy and of the province of Starkenburg.

Upper Hesse is mountainous and contains the arable tract known as the Wetterau. Southern Hesse is partly mountainous, and the greater part of the land lies in the basin of the Rhine, the rest in that of the Weser. The soil is very fertile and produces rye, barley, oats, potatoes and fruit, and the minerals are coal, iron and salt. The vine forms a most important object of culture, and fruit is very abundant. Darmstadt, the capital, Mainz, Giessen, Bingen and Worms are the principal towns. The grand duchy of Hesse originated in the division of the landgraviate of Hesse in 1567, and soon afterward all the territories were included in the two landgraviates of Hesse-Darmstadt and Hesse-Cassel. In 1806 the landgraviate of Hesse-Darmstadt was erected into a grand duchy with an enlarged territory, by Napoleon. It was reduced to its present limits in 1866, in the war between Austria and Prussia, when it had to cede to Prussia some districts in the north, besides Hesse-Homburg, which had been recently reunited with it. The executive authority is now vested in a grand duke, aided by a ministry. Population in 1900, 1,119,893.

Hesse-Cassel, a former electorate of Germany, now forming the district of Cassel in the Prussian province of Hesse-Nassau. As a landgraviate, Hesse-Cassel dates from 1567, when it was formed by William IV. In 1803 it was made an electorate and in 1806, although William I, the elector, remained neutral in the struggle with France, the territory was seized by Napoleon and made part of the kingdom of Westphalia. In 1813 it was reconstituted an electorate. Because Hesse-Cassel took sides with Austria in the Seven Weeks' War, it was occupied by a Prussian army and later incorporated with Prussia.

Hessian, *hesh'an*, **Fly**, a two-winged fly whose larvae are very destructive to wheat, barley and rye crops. It is called the Hessian fly from an unfounded belief that it was introduced into America in the baggage of the Hessians who were employed to fight against the Americans during the War of Independence. The female is about one-eighth of an inch in length, and has a wing expanse of about a quarter of an inch. The body is brown, with the upper parts of the head and thorax of a darker shade, approaching black. The wings are of a dusky gray, surrounded by fringes. The male is somewhat smaller than the female and has longer antennae. The eggs, which are laid in May and in September of each year, hatch in from four to fourteen days. The maggots work themselves in between

the leaf-sheath and the stem of the grain and, fixing themselves near the lowest joints, suck the



HESSIAN FLY

a, Fly, magnified; *b*, natural size; *c*, pupa cases ("flaxseeds") in different stages, natural size and magnified; *d*, barley stem, showing "flaxseeds" in position; *e*, stem bent down as a result of the work of the Hessian fly.

juices of the stem. The Hessian flies are most injurious in wet weather.

Hessians, the mercenary auxiliaries hired by Great Britain of the landgrave of Hesse-Cassel to serve against the American patriots. It is also applied to all the German mercenaries used by Britain in the war, of which Hesse-Cassel furnished 17,000, or a little more than half. About 2200 of them were killed in the war, and upwards of 5000 surrendered at Saratoga, Trenton and Bennington. Many deserted and became loyal and industrious American citizens.

Hewitt, ABRAM STEVENS (1822-1903), an American politician, born at Haverstraw, N. Y. When a small child, he removed with his parents to New York City and was sent to the public schools, then to Columbia College, from which he was graduated with high honors in 1842. In 1843 he began the study of law and was soon admitted to the bar, but gave up the profession and went into the iron business in partnership with Peter Cooper. The maintenance of Cooper Institute is largely due to Mr. Hewitt's efforts. In 1847 he was nominated by Tammany Hall to Congress. He was elected and was in Congress from that time until 1886, except during one term. In 1886 he was elected mayor of New York City over Henry George and Theodore Roosevelt. After his retirement from the mayoralty, Mr. Hewitt lived quietly, looking after his business interests, but continued to pay attention to municipal problems and reforms. He was elected chairman of the board of trustees of the Carnegie Institution in 1901.

Hew'lett, MAURICE HENRY (1861-), an English novelist, born in London. He received his education in London and was called to the bar in 1891, but he had early attracted some attention as a writer of romance and continued to devote himself to literary work. His reputation was greatly increased by the production of *Forest Lovers* in 1898. Of his later works the most successful have been *Pan and the Young Shepherd*, *Little Novels of Italy*, *Richard Yealand-Nay*, *New Canterbury Tales* and *A Fool Errant*. Most of these deal with medieval subjects with a remarkably interesting style and fine sentiment.

Hey'burn, WELDON BRINTON (1852-), an American lawyer and politician, born in Delaware County, Pa. He received only an elementary education, studied law and was admitted to the bar in 1876. Seven years later he removed to Idaho, there gained a large practice, entered politics as a Republican and was elected United States senator in 1903. He gained note as a champion of a bill to prevent the adulteration of foods.

Heyse, hi'ze, PAUL (1830-), a German novelist, poet and dramatist. Although his dramas were what first won him notice, his fame rests chiefly on his short stories, many of which are already classics. Best known of them is, perhaps, *L'Arrabiata*. He has produced several novels, among them *The Children of the World* and *In Paradise*, which have the same lightness of touch as his short stories, but they are pessimistic in tone.

Hezeki'ah, the twelfth and one of the best of the kings of Judah, was the son of Ahaz, whom he succeeded. He reigned from 720 to 691 B. C., or about that time.

Hiawatha, hi a wah'tha, the name of a mythical personage of miraculous birth, believed by the North American Indians to have been sent among them to clear the rivers, forests and hunting grounds and to teach them the arts of peace. The myth has been made the subject of a famous poem by Longfellow.

Hib'bing, MINN., a town of Saint Louis co., on the Great Northern and the Duluth, Missabe & Northern railroads, 80 mi. n. w. of Duluth. It is in an important iron and timber district and has mining and lumbering interests. Population in 1905, 6566.

Hi'berna'tion, the state of stupor in which many animals spend the cold months of winter or periods of drought and scarcity of food. As the time approaches for this change, the animal

takes on fat and becomes gradually more and more slow and inactive in its habits, until finally it passes into a deep sleep or stupor, from which it cannot, in some cases, be aroused until the period of cold or scarcity has passed. The depth and character of this stupor differ decidedly in different animals and in the same animals in different regions; they seem to be governed by the habits of the creatures during many generations. When an animal comes out of this state it has lost very much in flesh, and it is comparatively weak and inert, but after a short time it regains its natural vigor. Not all animals hibernate; in fact, the hibernating animals are chiefly those that feed upon vegetable matter. Indeed, some of these store food upon which they live during the cold season or, like the squirrels, hibernate for brief periods, which alternate with other periods of hunting for food. The woodchuck is one of the most notable hibernators, and almost all of the burrowing animals are similar in habit. In some species of birds it is only the females that hibernate, though the males sleep for long periods of time. Some mammals hibernate in the Northern states, but not in the South. Frogs, snakes and some fishes hibernate, the land animals burying themselves in the ground below the frost line, and the fish going into the mud beneath the water.

Hibernia, hi bur'ne ah, the ancient name of Ireland, applied to it first by Julius Caesar. Aristotle mentions this island by the name of *Ierne*; Ptolemy calls it *Juverna* and describes the island, with its principal rivers, towns and harbors.

Hibis'cus, an extensive genus of plants of the mallow family, chiefly natives of tropical climates. They have large, showy flowers, borne singly upon stalks toward the ends of the branches. They are chiefly shrubs, but one or two are herbs and a few attain the dimensions of trees. They are remarkable for abounding in mucilage and for the tenacity of the fiber of their bark, which in several species has many economic uses. The petals of the variety having large, handsome, usually red flowers, frequently seen in greenhouses, are used in China for a black dye for the hair and eyebrows. The root yields a mucilage used in Japan to give a proper consistence to paper. The leaves are eatable, and an oil is extracted from the seeds. In India the hibiscus is cultivated for its fiber and is known as Indian hemp.

Hiccough, hik'kup, or **Hic'cup**, a sudden convulsive spasm of the diaphragm, which stops the

Hickory

inspiration of air and produces a peculiar sound in the larynx. These convulsions come at brief intervals and may continue for a few moments, for hours, or, rarely, even till they cause exhaustion and death. Acute attacks of hiccoughs may be caused by an overloaded stomach or by some derangement of the digestive processes. These acute attacks may often be stopped by a long, slow inspiration or by a drink of water taken slowly, and oftentimes the attack will stop if the person's attention is distracted from it. Hiccough is also an accompaniment of a number of diseases, such as peritonitis, appendicitis and pneumonia, in which it is regarded as a grave symptom.

Hick'ory, the name given to several species of timber trees, natives of North America and remarkable for stateliness and general beauty. The wood is heavy, strong and tenacious and is used for making such things as carriage shafts, screws, whip handles and cogged wheels. The shagbark species yields the hickory nut of commerce, and its wood is very valuable.

Hicks, THOMAS HOLIDAY (1798-1865), an American politician born in Dorchester County, Maryland. He early entered politics and held at different times many important offices in his state, becoming governor in 1858. At the opening of the Civil War he sympathized with the South, but attempted to maintain neutrality for Maryland, in order to save the state from devastation by Union armies. Conditions finally compelled Hicks to assume a more stern attitude against the secessionists, and early in the struggle he was working vigorously for the Lincoln administration.

Hicks-Beach, MICHAEL EDWARD, Sir (1837-), an English politician. He entered Parliament in 1864 and represented Gloucestershire until 1885, when he was elected for Bristol. He served successively as undersecretary of the home department, secretary of the poor law board, chief secretary for Ireland, secretary for the colonies, president of the board of trade and chancellor of the exchequer.

Hides. See LEATHER.

Hierarchy, *hi'ur ahrk'y*, (Greek *hieros*, sacred, and *arche*, government), a term sometimes applied to the Church, sometimes to the authority which the governing body of the Church exercises as civil magistrate. In the Middle Ages the papal hierarchy, in the latter sense, gathered great temporal strength, and the pope became a spiritual monarch, ruling western Christendom with power but feebly limited by princes and

Hieroglyphics

councils. A reactionary movement began in the fourteenth century, and the general tendency of subsequent events has always been to make the civil and hierarchical power more and more independent of each other. The term *hier-archy*, as used to denote the governing and ministering body in the church, consisting of several ranks, can strictly be applied only to those churches which are ruled by bishops, such as the Roman Catholic Church and the Anglican Church.

Hieroglyphics, *hi'ur o gli'f'iks*, (from the Greek, meaning *sacred carving*), a term originally applied by the Greeks to the inscriptions sculptured on buildings in Egypt, in the belief that the writing was confined to sacred subjects and legible only to the priests. The term as commonly used means any system of writing by means of pictures, but is particularly applied to the writings of the Egyptians and the Mexicans.

Three different modes of writing were used by the ancient Egyptians, the hieroglyphic, the hieratic and the demotic. Pure *hieroglyphic* writing is the earliest, and consists of figures of material objects from every sphere of nature and art, with certain mathematical and arbitrary symbols.

Next was developed the *hier-atic*, or priestly, writing, the form in which most Egyptian literature is written, and in which the symbols almost cease to be recognizable as

figures of objects. Hieratic writings of the third millennium B. C. are extant. In the *demotic* writing, derived directly from the hieratic, the symbols are still more obscured. The demotic was first used about the seventh century B. C., and within two or three centuries it had become so common that it was used for practically everything except religious purposes.

Down to the end of the eighteenth century scholars failed to find a clue to the hieroglyphic writings. In 1799, however, a French captain of engineers discovered at Rosetta the celebrated stone which afforded European scholars a key to the language and writing of the ancient Egyptians. It contained a trilingual inscription, in hieroglyphics, demotic characters and Greek, which turned out to be a decree of the priests in honor of Ptolemy V, issued in 195 B. C. The last paragraph of the Greek inscription stated that two translations, one in the sacred and the



CARTOUCHE
OF CLEO-
PATRA



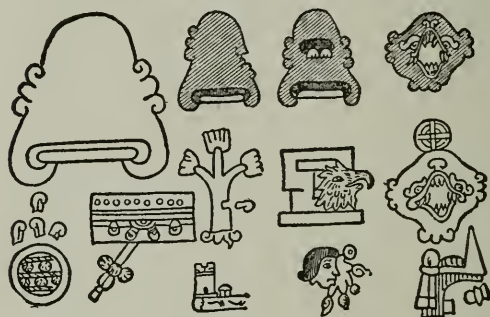
CARTOUCHE OF
PTOLEMY

other in the popular Egyptian language, would be found adjacent to it. The discovery of an alphabet was the first task. The demotic part of the inscription was first examined by De Sacy and Akerbald, and the signification of a number of the symbols was ascertained. The hieroglyphic part was next carefully examined and compared with the demotic and Greek. At last, after much study, Champollion and Dr. Thomas Young, independently of each other, discovered the method of reading the characters and thus provided a clue to the decipherment of the ancient Egyptian writing.

Hieroglyphic characters are either *ideographic*, that is, using well-known objects as symbols of conceptions, or *phonetic*, that is, representing words by symbols standing for their sounds. The phonetic signs are again divided into alphabetical signs and syllabic signs. Many of the ideographic characters are simple enough; thus, the figures of a man, a woman, a calf, indicate simply those objects. Others, however, are less simple and convey their meaning figuratively or symbolically. Water was expressed by three zigzag lines, one above the other, to represent waves or ripples of running water; milk by a milk jar; oil by an oil jar; fishing by a pelican seizing a fish; seeing and sight by an eye, and so on. The nature of the phonetic hieroglyphs, which represent simply sounds, will be understood from the following explanation, which gives also some idea of the first steps in the decipherment.

(1) The first hieroglyph in the name of Kleopatra is a knee, which is *kne* or *kle* in Coptic and represents the K of Kleopatra. (2) The second hieroglyph in Kleopatra is a lion couchant, which is *laboi* in Coptic and *labu* in the old Egyptian and represents the L of both Kleopatra and Ptolemaios (Ptolemy). In Kleopatra it occupies the second place, and in Ptolemaios the fourth. (3) The third hieroglyph in Kleopatra is a reed, which is *ake* in Coptic and *aak* in the old Egyptian and represents the E of Kleopatra. The reed is doubled in Ptolemaios and occupies the sixth and seventh places, where it represents the diphthong *ai* of Ptolemaios. (4) The fourth hieroglyph in Kleopatra is a noose, which represents the O of both names and occurs in the third place of Ptolemaios. (5) The fifth hieroglyph in Kleopatra is a mat, which represents the P of both names and is the initial letter of Ptolemaios. (6) The sixth hieroglyph in Kleopatra is an eagle, which is *akhoom* in Coptic and represents the A, which is found twice in the name Kleopatra,

but does not occur in the name Ptolemaios, although the diphthong *ai* occurs as described above. (7) The seventh hieroglyph in Kleopatra is a hand, which is *toot* in Coptic and represents the T of Kleopatra, but does not occur in Ptolemaios, where it might be expected to occupy the second place. The second place in Ptolemaios is occupied by a semicircle, which is found at the end of feminine proper names and is the Coptic feminine article T. The researches of Champollion satisfied him of the existence of characters having the same phonetic value, which might be interchanged in writing proper names. (8) The eighth hieroglyph in Kleopatra is a mouth, which is *ro* in Coptic and represents the R of Kleopatra. (9) The ninth hieroglyph in Kleopatra is the eagle, which is explained in



MEXICAN HIEROGLYPHICS

No. 6, above. (10) The semicircle is the T of Ptolemaios, which with 11, the egg found at the end of proper names of women, is a feminine affix. In the name of Ptolemaios there are still the M and the S to account for. The fifth hieroglyph in the name of Ptolemaios is a geometrical figure, probably originally representing the three sides of a parallelogram, but now called a hole, because the Coptic *mu* has that signification. It represents the M. The hook represents the S of the word Ptolemaios. Vowels were regarded by the Egyptians only as they were needed to avoid ambiguous writing. The oval frame which surrounds the names and which is known as a *cartouche* was always used to enclose the names of kings.

The hieroglyphics of the Aztecs or Mexicans, used in Central America and Mexico previous to the discovery of America by Columbus, were much less perfect than the Egyptian. The characters were for the most part ideographic, and the pictures used were highly conventionalized, though the system was for the most part rude. Most of the manuscripts containing these

hieroglyphics have been destroyed, so that the Mexican writing is almost entirely unintelligible.

There have been found groups of hieroglyphics which combine the two kinds of characters—the ideographic and the phonetic. According to Ebers, in the perfected system of hieroglyphics the symbols for sound and syllables are to be regarded as the foundation of the writing, while symbols for ideas are mingled with them to render the meaning more intelligible, to furnish ornamentation or to keep up the mystic character of the hieroglyphics.

Higgins, FRANK WAYLAND (1856–1907), an American politician, born in Rushford, Alleghany County, N. Y. He graduated at a military academy in Poughkeepsie, engaged in business at Stanton, Mich., in 1875 and removed to Olean, N. Y., in 1879. He was state senator from 1894 to 1902, was elected lieutenant governor in the latter year and became governor in 1904, as a Republican.

Higginson, THOMAS WENTWORTH (1823–), an American essayist, born at Cambridge, Mass. He graduated at Harvard in 1841 and began preaching, but subsequently left the ministry to devote himself to literature and became conspicuous as an antislavery agitator. In 1862 he served as captain of the fifty-first Massachusetts regiment, and in that same year he was made colonel of the first regiment of freed slaves mustered into the national service. Among his works are *Outdoor Papers*, *Army Life in a Black Regiment*, *Oldport Days*, *Common Sense about Woman*, *Cheerful Yesterdays*, *History of the United States* and a memoir of Longfellow. Higginson has been an earnest advocate of woman's suffrage.

Highbinders, a name applied in California to the lower class of Chinamen, who have no regular occupation, but secure their living through gambling, thievery and connivance with criminals.

High Priest, the chief of the Jewish priesthood. The office was first vested in Aaron and was handed down to his eldest son, Eleazer, and so on in regular succession. At first the office was for life, but Herod, and afterward the Romans, jealous of the power which so long a term gave the high priest, made and unmade the pontiffs at will. A high priest might not assume the office till he was twenty. His duties were to oversee the sanctuary, its service and its treasure, and on the Day of Atonement to enter the Holy of Holies. He could perform any priestly function. His vestments were very costly, but when

he went to the Holy of Holies he wore only a white garb.

High School, a public school, ranking in its grade of instruction between the grammar school (See COMMON SCHOOLS) and the college. The first public high school in the United States was the English High School of Boston, which was established in 1821. Since that time the high school has become a general and potent factor in all systems of public education throughout the country. The courses of study usually include those subjects required for admission to universities and technical schools and such other branches as will fit for life those who do not desire to attend higher institutions of learning. Most high schools now maintain commercial courses, and many have departments of manual training and domestic science. The support of the high school in the United States depends upon the system of education in the state where it is located. Most high schools are a part of the city system of schools and are supported in the same manner as other schools. In some states direct state aid is given to high schools which reach a required standing, and such schools are affiliated directly with the state university. In Minnesota the university prescribes the questions for final examinations in the affiliated high schools, those graduates who reach a certain standard being admitted to the university without further examination. In Wisconsin the university, by means of frequent reports and inspections, keeps in close touch with the high schools of the state and prepares a so-called accredited list of schools, the graduates of which may enter the university without further examination. The graduates of other schools must undergo a test at the university. Some states, of which Illinois is a typical example, have provided for establishing township high schools. One or more townships may constitute the territory from which the school derives its support and in which pupils may be educated free of the charge of tuition. This provision often admits of the establishment of a high school in localities where there are no cities or towns of sufficient size to support a school of high school grade.

High Seas, the open sea or ocean. The claims of various nations to exclusive rights and superiority over extensive tracts of the ocean-highway have been settled after much controversy by a general international principle, namely, that the jurisdiction of maritime states extends only for three miles from their own coasts; the remainder of the seas are accessible on equal

terms to all nations. Inland seas and estuaries, of course, are excepted.

Highways, places over which the public has a right to go. They include roads, streets, paths, driveways, canals, ferries, bridges, navigable streams and public squares. Highways may be created by act of government, or *condemnation*, in which case the owner of the property which is transformed into a highway is recompensed according to the value of his property, or they may be created by *dedication*, that is, through the voluntary act of the owner of the property. In order for it to be a highway, however, its dedication must be accepted by the authorities who are compelled by law to keep it in repair. This dedication may be either express or implied. If an owner without protest allows the public to pass over a part of his property for a considerable period of time, the law will consider that he has by implication created a highway and will not permit him to close it.

In most countries, the authority over highways rests with the smallest political divisions, such as the parish in England and the town or county in the United States. However, in the United States the authority originally rested with the state, which has delegated its right to the smaller divisions. Though the public has a right to the use of the highway, it does not own the land over which it passes, but this ownership rests with the owners of the abutting property. This naturally implies a right in the public or in any traveler to the use of the whole highway, and therefore a right to remove an obstruction in any part of it, while it also implies the right of the owners of the abutting property to all the value of the land beneath the street, that is, to mines or any other thing of value which is found there. Any legislature may establish private highways, giving the persons to whom it grants the road a right to exact toll or taxes from passers-by to pay for its repair.

In the United States teams meeting in a highway are supposed to turn to the right, while in England they are expected to turn to the left. This rule has been recognized by law in most states, and in case of accident from its violation, the violator will be liable for damages. See **ROAD**.

Hildreth, RICHARD (1807-1865), an American historian, born in Massachusetts. He graduated at Harvard, studied law and was admitted to the bar. After practicing for two years he became editor of the *Boston Atlas*, a leading political paper. For two years he lived on a

plantation in Florida, and as a result of his observations he published a novel, *The Slave*, or *a Memoir of Archy Moore*, attacking slavery. This was afterwards republished as *The White Slave*. The work for which he is best known is his *History of the United States*, an accurate account of the history of the country up to Monroe's administration. The bias is strongly Federalist.

Hill, an elevation of land, rising above the surrounding country but lower than a mountain. Very high hills are often called mountains, although this term should not be applied to them when their altitude is less than two thousand feet. Hills are frequently formed by erosion (See **EROSION**); for instance, the wearing away of plateaus by streams frequently cuts them into hills, whose crests are on a level with the surface of the plateau (See **MESA**). Hills are sometimes formed by volcanic action. These take the form of cones and are found in the craters of volcanoes, or they may have been formed by the cooling of molten lava, in which case they are known as *coulees* (See **VOLCANO**). They may be formed by glaciers, which on melting deposit their load of stones and gravel (See **MORaine**). The ranges of hills about the base of mountains are called foothills. See **MOUNTAIN**.

Hill, AMEROSÉ POWELL (1825-1865), an American soldier. He graduated at the United States Military Academy in 1847, entered the first artillery and was made second lieutenant. He served in the Mexican War and afterward on the frontier and in Florida. Later he was promoted to be captain. At the outbreak of the Civil War he entered the Confederate service, was appointed colonel of the thirteenth regiment of Virginia volunteers and was ordered to Harper's Ferry. He fought at the first Battle of Bull Run, at Antietam, Fredericksburg, Chancellorsville and Gettysburg, was promoted to be brigadier general and later was made major general. He was killed while reconnoitering at Petersburg.

Hill, BENJAMIN HARVEY (1823-1882), an American legislator, born in Georgia and educated at the state university. He was admitted to the bar, entered politics and in 1851 was chosen to the state legislature as a Whig. In the controversy over secession he was a Unionist, but followed his state and was chosen to the first Confederate Senate. After the war he was a prominent Democrat, vigorously opposed Congressional reconstruction, supported Greeley for the presidency and became a member of the House of

Representatives in 1875. In the following year he was chosen to the United States Senate, where he served until his death.

Hill, DANIEL HARVEY (1821-1889), an American soldier. He graduated at the West Point Military Academy in 1842, served throughout the Mexican War and attained the brevet of major. At the beginning of the Civil War he entered the Confederate army and was made colonel of the First North Carolina regiment. On June 10, 1861, he fought the Battle of Big Bethel, was soon promoted to be brigadier general and fought against McClellan in the Peninsula Campaign. He took part in the battles of Antietam and Chickamauga.

Hill, DAVID BENNETT (1843-), an American politician, born in Havana, N. Y. He was admitted to the bar in 1864, practiced law at Elmira and in 1870-1871 served in the state legislature. In 1882 he was elected mayor of Elmira; in November of the same year, he was chosen lieutenant governor of New York State, and in 1884, when Grover Cleveland resigned the position of governor, he succeeded to that office. In 1885 he was elected governor for the term expiring in 1888 and was reelected. He then became United States senator for New York State, but failed of reelection because the legislature elected in 1896 was Republican. He was a prominent candidate for the Democratic nomination for president in 1892.

Hill, DAVID JAYNE (1850-), an American author and educator, born at Plainfield, N. J., and educated at Bucknell University. He was professor of rhetoric in his alma mater for two years and then became president of the institution. In 1888 he was called to Rochester University as president, and for several years after resigning his position he was engaged in the study of law and diplomacy and for a time was connected with the department of state at Washington. The best known of his works are upon rhetorical subjects, including *The Science of Rhetoric* and *The Elements of Rhetoric and Composition*.

Hill, JAMES J. (1838-), an American capitalist and promoter, born near Guelph, Ontario, of Scotch-Irish descent. He early emigrated to Minnesota, where he was employed in steamship offices until 1865. Later he engaged in independent fuel and transportation business, becoming interested in extending communication between the Mississippi River and the North and West. Gaining control of the Saint Paul & Pacific railroad company, he reorgan-

ized the system, became successively its general manager, vice-president and president and made it the nucleus of the Great Northern system, which he organized in 1890, having meantime completed rail communication between Lake



JAMES J. HILL

Superior and Puget Sound and established a steamship line between America and the Orient. In 1902 he was the chief promoter of the Northern Securities Company, which aimed to establish a community of interest between several trans-continental lines.

Hill, ROBERT THOMAS (1853-), an American geologist, born in Nashville, Tenn. After living for some time in Texas, where he studied geography and geology, he entered Cornell University and began the study of science. Before his graduation he was appointed to the United States Geological Survey, and a little later he became professor of geology in the University of Texas, which position he gave up to return to the Geological Survey, where he afterwards remained. Hill's important explorations have been along the southern border and in the southwestern portions of the United States. He is also known by his demonstration of the existence of the Lower Cretaceous formations in the United States and the existence of such conditions as made artesian wells possible over a large dry area in Texas, the results of which have been the sinking of numerous wells and the irrigation of a large region which was before valueless. His important work is *Cuba and Porto Rico with Other Islands of the West Indies*.

Hil'lis, NEWELL DWIGHT (1858-), a Presbyterian clergyman, born at Magnolia, Iowa, and educated at Iowa College, Lake Forest University and McCormick Theological Seminary. He served as pastor at Peoria, Ill., and Evanston, Ill., and succeeded David Swing as pastor of Central Church, Chicago. In 1899 he accepted a call to Plymouth Church, Brooklyn. He is the author of *The Investment of Influence, How the Inner Light Failed, Great Books as Life Teachers* and other works.

Hillsboro, *hilt'bur o*, TEX., the county-seat of Hill co., 34 mi. n. of Waco, on the Missouri, Kansas & Texas and other railroads. The city is in a fertile agricultural region and has a large trade in cotton, grain, live stock, hides and lumber. It has one of the largest cotton compresses in the state; also cotton gins and oil mills, flour and planing mills and manufactories of hosiery, clothing, agricultural implements and other articles. Population in 1900, 5346.

Hilo, *he'lo*, the chief town of the island of Hawaii, and the second largest in the Sandwich Islands. The soil in the neighborhood is very fertile and produces sugar, rice, arrowroot and coffee. There are also extensive forests. Population of district, 19,785.

Himalaya, *him mah'la yah*, a chain of snowy mountains in Asia, the most elevated on the earth; they separate the Indian peninsula from the plateau of Tibet. The length is nearly 1500 miles, the great mass reaching from the great bend of the Indus on the west to the great bend of the Brahmaputra on the east, and the breadth is from 100 to 160 miles. The Himalayas are not a single mountain system, but form a series of rugged peaks. The average elevation of the range has been estimated at from 16,000 to 18,000 feet, but many of the peaks are known to exceed 24,000 feet. Among the highest points are Mount Everest, 29,002 feet, so far as known the highest point in the world; Nanga Parbat, 26,629 feet; Dhawalaghira, 26,826, and Kunchinjunga, 28,156. Among the numerous passes, which are the loftiest in the world, are the Ibi Gamin, 20,459 feet; the Mustagh Pass, 19,000 feet; the Mana Ghat; the Parang La, and the Chang La. The Himalayas abound in giant glaciers, the longest being the Zamu, which measures eighteen miles. There are no lakes in the region, and there are no volcanoes, but earthquakes are frequent. The chain is divided into a west, middle and east portion. The west is that drained by the five rivers of the Punjab, from the Indus to Sutlej; the middle portion,

that drained by the Ganges, and the east, that drained by the Brahmaputra.

The vegetation is extremely varied, and on the steep southern slopes it is very luxuriant. Tropical plants, such as the plantain, fig and palm trees, are found up to a height of 3000 feet, and beyond this, up to 7000 feet, is a belt in which oaks, chestnuts and laurels are common. The succeeding belt, up to about 12,000 feet, has deodar, cedars and pines, and beyond this are the regions of gnarled trees and shrubs and the grass lands. The highest point at which trees are found is 14,000 feet, on the north side, but in the central range trees are not common above 11,000 or 12,000 feet. Grain is grown on the north side at 14,000 to 15,000 feet. The mountains are famous for their wonderful growths of rhododendron, and the flowering plants are found at an altitude of 19,500 feet. The tea plant is grown up to 5000 feet on the southern face. The animal life is also abundant and varied and conforms in distribution to that of the plant life. The tiger, leopard, rhinoceros and monkey are found. The region around Tibet is the home of the yak, and the mountains may also be considered as the home of the pheasants. The more important explorations of the Himalayas are those of Hooker, the Schlagintweit brothers, Waugh, Graham and Sir William Conway.

Hincks, FRANCIS, Sir (1807-1885), a Canadian statesman, born at Cork. He emigrated to Canada at the age of twenty-four and engaged in business at Toronto, where he became the editor of the *Examiner* and a leader in the Liberal party. He was elected to the parliament in 1841, taking a prominent part in liberalizing Canadian government. He was made premier in 1851, but was defeated in the election of 1854 and thereafter served as governor of Barbados and of British Guiana. Returning to Canada, he became minister of finance in 1873 and later editor of the *Montreal Journal of Commerce*. He was the author of several books upon political and financial affairs in Canada.

Hindu-Kush, *hin'doo koosh*, or **Indian Caucasus**, a mountain system of Central Asia. It is generally considered as a continuation of the Himalayas. Its culminating point, Tirach Mir, in the range of Hindu-Koh, is far beyond the limit of perpetual snow and is supposed to measure 25,000 feet high. The Oxus and several other streams have their source in these mountains.

Hindustan

Hindustan, *hin doo stahn'*, the name which is commonly given to the whole Indian Empire, but which properly applies only to the Punjab and the Ganges valley. See INDIA.

Hin'nom, VALLEY OF. See GEHENNA.

Hins'dale, BURKE AARON (1837-1900), a prominent American educator, born at Wadsworth, Ohio. He was educated in the public schools and first came into prominence as president of Hiram College. After twelve years of service there he became superintendent of the Cleveland, Ohio, public schools. In 1888 he accepted the chair of science and art of teaching in the University of Michigan, which position he held until his death. He rendered most important services in raising his department in this institution to a rank among the best in the country. He was a distinguished member of the National Educational Association and of the National Council of Education. He published several works of recognized authority, among which are *Teaching the Language Arts*, *Jesus as a Teacher*, *Studies in Education*, *How to Study and Teach History* and *The American Government*.

Hippa'ron, a fossil genus of the horse family, of the Upper Miocene and Pliocene periods. The members are distinguished by the fact that each foot possesses a single fully-developed toe, bordered by two functionless toes, which do not touch the ground, but simply dangle on each side of the central toe. The hipparion was about the size of an ass; one American species was, however, about the size of a goat.

Hip'pocampus or **Sea Horse**, a genus of fishes, closely allied to the pipefishes, of singular construction and peculiar habits; the upper parts have some resemblance to the head and neck of a horse in miniature, which has suggested the name. When swimming they maintain a vertical position. The tail curls downward and inward and can be used to hold on to seaweed. Their general length is from six to ten inches. These fishes are found in the Mediterranean and the Atlantic. A curious fact is that the male carries the eggs in little pockets until they are hatched.



SEA HORSE

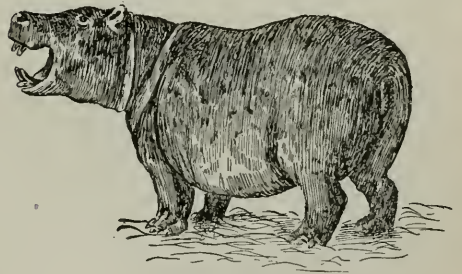
Hippocrates, *hip pol'ra teez*, (460-357 B. C.), the most famous among the Greek physicians, often called the "father of medicine." Besides

Hippopotamus

practicing and teaching his profession at home in the island of Cos, he traveled on the mainland of Greece and died at an advanced age at Larissa, in Thessaly. His writings, which were early celebrated, became the nucleus of a collection of medical treatises by a number of authors of different places and periods, which were long attributed to him and still bear his name. The best edition is that of Littré. Among his genuine writings are the first and third books on epidemics; the aphorisms; on diet in acute diseases; on air, waters and localities; on prognostics; on wounds of the head. Hippocrates was one of the first to insist on the importance of diet and regimen in disease.

Hip'podrome, the Greek name for the public place where the horse and chariot races were held. In Byzantine times the hippodrome at Constantinople acquired great renown, and factions originating in the hippodrome caused perpetual confusion in all departments of the public service. The name is sometimes applied to a modern circus, and specifically to great amusement places in London and New York.

Hip'popot'amus, an unwieldy African animal, of which two living species are known. One



HIPPOPOTAMUS

species is of large size and is common throughout the greater part of the continent; the other is not only smaller, but has other important differences and is found only in the west coast rivers and those flowing into Lake Chad. The large species has a thick, square head, a very large muzzle, small eyes and ears, a thick and heavy body, short legs, a short tail and no hair, except at the extremity of the tail. It has also tusks, which sometimes reach the length of two feet and more and which weigh upward of six pounds. The animal is killed by the natives, partly for food, but chiefly on account of the tusks and teeth, which are harder than ivory and less liable to turn yellow. The hippopotamus is remarkable for its "blood sweat," a

Hiroshima

blood-red fluid exuded from and covering the skin, but it has no connection with the blood. The hippopotamus occasionally reaches the length of seventeen feet and stands about five feet high. It delights in water, living in lakes, rivers and estuaries and feeding on water plants or on the herbage growing near the water. It is an excellent swimmer and diver and can remain under water a considerable time. Among the ancient Egyptians it was revered as a divinity, as it is still among the negroes in some localities.

Hiroshima, *he'ro she'mah*, a city of Japan, situated near the southwestern extremity of the island of Hondo, on the coast and on the railway connecting Osaka with Shimonoseki. It is one of the important commercial ports of the Empire and has a large trade in lacquer ware and bronzes. Population in 1899, 122,306.

Hirsch, *heersh*, EMIL GUSTAV (1852-), an American rabbi, born in Luxemburg. He came to the United States in 1866 and later graduated from the universities of Pennsylvania, Berlin and Leipzig. At different times he was rabbi at Baltimore, Louisville and Chicago, doing his best work as rabbi of the Sinai Congregation in the last-named city. In 1892 he became professor of Hebrew in the University of Chicago. A volume of his sermons has been published.

Hirsch, MAURICE, Baron de (1831-1896), an Austrian financier and philanthropist, born of Jewish parentage in Batavia. He accumulated his fortune in the banking-house of Bischoffsheim and Goldsmid, in the construction of railroads and in other enterprises. By his munificent gifts he promoted the cause of education in various parts of the world. In Egypt and Turkey he founded industrial schools, and in 1888 he offered the Russian government \$10,000,000 for schools, on the condition that race and religious distinctions should not influence the distribution of the fund. It is reported that in one year alone he gave \$15,000,000 to charity. In 1892 his contribution for the benefit of Jewish emigrants from Russia to America amounted to \$2,500,000.

Histology, *his tol'o jy*, that branch of anatomy which treats of the microscopic structure of the different tissues of the body. The science originated as far back as the seventh century, but it made little progress until the invention of the compound microscope in the nineteenth century. Since that time, by the combination of the microscope and camera, many important discoveries in the structure of tissues have been

History

made. It was through histology that the peculiar cell structure of the different tissues was discovered; also by the aid of the microscope the presence of nerves and blood vessels in these tissues was revealed. Many diseases are determined by studying the different tissues and glands under the microscope, because most of these diseases are due to some disorganization of the cells.

History. This term has three meanings, which are sufficiently distinguished in modern usage to be considered separately. It denotes the events, forces and institutions which together disclose a people's social character and progress; it denotes the branch of science which studies these things, and, finally, it denotes the branch of literature in which they are narrated and discussed.

In the first sense the history of a people includes every item which has interest or importance in connection with that people's life and growth. Thus, it deals with social, industrial, intellectual, religious and political facts and with the lives of men, to the extent that the lives of individuals affect the course of any people's history. Some writers have asserted, as does Emerson, that the "history of any people may be resolved into the biographies of a few great men." This statement is hardly true, in a broad sense, however, for the central fact of all history has apparently been the struggle of man for liberty or for the truth, and though this struggle has often been led by great individuals it has always been the outgrowth of social conditions and has been carried forward by the many rather than by the few.

As a study, or branch of science, history differs from other sciences in lacking their exact character. The laws of mathematics and of physics are fixed and determinable, but since history deals with all the influences which affect human life, and these are infinite in number and variety, the laws of human progress cannot be framed with such a degree of certainty; so, with sociology, economics and politics, history may be classed as an inexact science. It differs from both sociology and politics in that it seeks only to ascertain and interpret facts, but in itself does not attempt to discover the general principles by which those facts are related. Historical investigators are dependent upon certain classes of materials for their information. These may be called (1) remains, such as buildings, implements and ruins; (2) laws and documents, from which governmental facts may be ascertained; (3) art

and literature, in which the general social character and ideals of a people are disclosed; (4) contemporary historical narratives or annals, and (5) traditions. Besides collecting facts from such evidence, the historian must arrange and classify them, both as to their position in time and place and as to their importance. He must then study them critically, for the purpose of discarding those which are fraudulent or untrue. Having accepted a body of information, he must then interpret it in the light of his knowledge of human nature and of other facts in his possession.

In accordance with these processes, human history has been organized into somewhat arbitrary divisions upon a chronological basis. *Ancient* history deals with the civilizations and careers of the nations of antiquity, such as Babylon, Assyria, Egypt, Greece and Rome. It begins with the first event whose character is positively known and whose results can be traced. This is about ten thousand years ago. Its termination is variously assigned by historians, some considering it to be at the downfall of the Roman Empire before the German barbarians in the fifth century, others extending it till the time of Charlemagne, when a new order of things was plainly beginning to arise, and end others, with perhaps best reason, making it still only at the death of Charlemagne and the dissolution of his empire in 814. At that point *medieval* history begins, including the centuries of confusion during which the ideals of universal unity, in politics, religion and thought, which prevailed in the ancient world, were supplanted by extreme individualism, which, in turn, gave way in the *modern* world to the ideal of nationality, a compromise between the two. This date may be placed at about the middle of the fifteenth century, at the fall of Constantinople, when the nations of Europe, with whom history chiefly deals, first consciously felt the spirit of modern progress which turned them from the East toward the West and into the paths of modern civilization.

As a branch of literature, history is of the greatest importance, for it includes some of the earliest and greatest writings known to men. But a noticeable change has taken place within the last few centuries in the manner and method of historical writing. For centuries writers were compelled to rely upon myths, traditions and oral testimonies. They had little basis upon which to criticise facts and made little effort to secure absolute accuracy. So the earliest historical writings are interesting, not, chiefly,

for the historical facts which they contain, but for their literary merit. But in recent times, with the development of the scientific spirit and its extension into all fields of study, historians, though still paying attention to literary form, have directed their efforts particularly to the search for truth and its narration without prejudice or partiality. Through this change the importance and value of history study was increased many fold, for it is upon history that the students of all other social sciences must rely for the data upon which to judge of present conditions and tendencies.

The spirit and content of history have been ably discussed by some of the greatest writers of recent times, and the reader is referred to such excellent essays as that of Ralph Waldo Emerson on *History* and Frederic Harrison on the *Meaning of History*. The following list includes many of those historical works which critics have considered most far-reaching in their influence:

Herodotus's *History*; Thucydides's *History of the Peloponnesian Wars*; Xenophon's *Memorabilia*; Polybius's *Histories*; Caesar's *Commentaries*; Livy's *Ab urbe condita libri*; Tacitus's *Histories* and *Annals*; Gibbon's *Decline and Fall of the Roman Empire*; Voltaire's *Age of Louis XIV*; Mommsen's *History of Rome*; Ranke's *History of the Popes* and *Universal History*; Macaulay's *History of England from the Accession of James II*; Freeman's *History of the Norman Conquest*; Green's *History of the English People*; Lecky's *History of the Rise and Influence of the Spirit of Rationalism in Europe*; Buckle's *History of Civilization*; Froude's *History of England from the Fall of Wolsey to the Defeat of the Spanish Armada*; Carlyle's *The French Revolution*; Grote's *Greece*; Guizot's *History of Civilization*; Bancroft's *History of the United States*; Prescott's *History of the Conquest of Peru* and *History of the Conquest of Mexico*; Parkman's series of works upon the French in America, beginning with *Pioneers of France in the New World* and closing with *The Conspiracy of Pontiac*; Motley's *The Rise of the Dutch Republic* and *The History of the United Netherlands*; Fiske's series of works covering the whole field of American history, of which the best is probably *The Critical Period of American History*; Ridpath's *History of All Nations and Races*; MacMaster's *History of the People of the United States*, and Rhodes's *History of the United States from the Compromise of 1850*. See HISTORY, METHODS OF TEACHING.

History, METHODS OF TEACHING. PURPOSES. The purposes of teaching history are:

1. To teach the facts of history so that the pupils will be well informed concerning the origin and growth of the country and the principles upon which the nation is established.

2. To stimulate patriotism. Patriotism may be considered as of two classes, military and civic. Of the former class there is no lack. The opportunity to join an army, to engage in military parades and to go forth to war contains attractions that appeal strongly to young men, and whenever the country is imperiled by enemies, foreign or domestic, there are always thousands ready to rush to her defense.

Military patriotism needs little encouragement; it is not the sort that requires the greatest amount of attention on the part of the teacher. Civic patriotism is of a more quiet nature; yet it often requires the exercise of a moral heroism far greater than the physical courage required of the soldier. Civic patriotism includes all of those virtues that make the honest and upright citizen; the man who would not wrong another in business; who is careful and conscientious in the discharge of all of his political duties, and who is willing, if called upon, to accept public office and discharge his duties faithfully, because of his interest in the public welfare. Patriotism of this sort needs to be emphasized; nowhere can this be done to better advantage than in the history class.

3. To develop the minds of the pupils. History is a valuable study for the purpose of appealing to the imagination, exercising the memory and strengthening the reasoning powers. This last line of development, however, should be left largely to the work of the advanced grades; but the history stories suitable for the lower grades, both primary and intermediate, are remarkably well adapted to training the imagination and memory and to materially assisting the pupil in the development of language.

4. To train the judgment. History is far from being a memory study. It presents a series of problems, each of which arises from certain causes and must be solved in accordance with certain conditions. In the discovery of these causes and conditions and the forming of conclusions by their comparison, there is afforded one of the best opportunities possible for training the reasoning powers. Since history is not an exact science (See HISTORY), and since the causes and conditions are largely dependent

upon human action, the problems to which they give rise are more various, more complex and more far-reaching than are the problems of mathematics and other exact sciences, and if history is properly taught in the grammar grades, it is one of the most valuable branches for training the reasoning powers.

5. To direct the reading of the pupils. The breadth of the subject requires extensive reading on the part of the pupils, if they would acquire a comprehensive knowledge of history. This reading cannot all be done while they are pursuing the work as provided by the course of study or during their period in the public schools, but the proper use of supplementary reading and careful direction by the teacher will lead most pupils to acquire a love for the reading of historic works, and this love once acquired, it will lead to the continuance of historic study after the work of the school is finished.

6. To strengthen character. The study of the lives and characters of the great leaders of our own and other nations never fails to exert an ennobling influence upon the pupils and to give them an inspiration to attain high ideals and to live pure lives. This is the most important of all the results to be obtained from this study. In short, all that has been said under *Purposes* can be summed up in this: The purpose of teaching history is to make good citizens.

PREPARATION OF THE TEACHER. In order that the above purposes may be attained, the teacher of history needs an adequate preparation for the work. This preparation should include:

1. A thorough knowledge of the subject, including its relation to other subjects, and especially to geography.

2. A knowledge of the methods of teaching. See **METHODS OF TEACHING.**

3. Ability to direct pupils in their study of history, especially in the use of supplementary matter, such as reference books and books for collateral reading.

4. Ability to present the subject in a clear, vivid and interesting manner. This preparation can be obtained in professional schools, such as normal schools and colleges, in a measure in the public schools, provided the pupil is under a good teacher, and in a great measure by self study. The knowledge of history that the teacher should have as a foundation for her work must far exceed a knowledge of the facts that she expects to teach, for without this extensive knowledge she will be unable to make

a wise selection of facts or to present them in their proper setting.

The work in history in the public schools naturally divides itself into three groups, that of the primary grades, that of the intermediate grades and that of the grammar grades.

PRIMARY GRADES. The teaching of history in the first and second grades should be wholly oral and should consist of history stories. These may be biographies, which include the boyhood of eminent men, such as Washington, Lincoln and Columbus, or the stories of certain phases of history that the children can easily understand. These will include stories of exploration, such as a brief account of John Smith, including the settlement of Jamestown and the story of Pocahontas; stories of invention, such as the invention of the cotton gin and the steamboat, and accounts of the manners and customs of the early colonists. These stories should be told by the teacher and after they have been repeated two or three times, reviews should be conducted, in which the pupils should tell back to the teacher the stories to which they have listened. As far as possible, the children should tell the story in a connected form. This gives training in language as well as in history. In the preparation of these stories the teacher should use care to keep them within the capacity of the pupils, to present them in such a way as to make them attractive and to enable the pupils to understand fully everything that is narrated. In order that this may be done, the teacher should prepare the story with a view to the facts that will be presented, to the language that is to be used and to the time required. Young children will listen to a vivid account for eight or ten minutes, but when the account is prolonged beyond this time many of them become inattentive; hence the story should be short and pointed.

In the third grade the stories told by the teacher should be supplemented by reading on the part of the pupils. If it is impossible to procure books for the pupils to read, the teacher should read from such suitable books as she can obtain. A good illustration of the class of books valuable for pupils of this grade is found in the following list: Edward Eggleston's *Stories of Great Americans for Little Americans* and *Stories of American Life and Adventure*; Mary Hall Husted's *Stories of Indian Children* and Annie Chase's *Children of the Wigwam*. Among biographies valuable for this grade are found Jesse R. Smith's *Life of Washington*;

James Baldwin's *Benjamin Franklin*, also his *Stories of Great Americans*; Frances Perry's *Four American Inventors*, and Anna Holman Burton's *Four American Patriots*. These are fair samples of a large number of books now easily obtainable.

All through these grades the pupils should be taught sentiments of a patriotic nature, including patriotic songs and extracts from such poems as *The Landing of the Pilgrims* and the *Building of the Ship*. In the selection of subject-matter for this work the teacher should be guided almost entirely by the capacity of the pupils, since in grades having a large percentage of children of foreign extraction who are not familiar with English, memory gems can scarcely be attempted before the latter part of the second year.

INTERMEDIATE GRADES. The work of the intermediate grades is a continuation of that in the first three grades. To the stories told by the teacher there should be added more or less systematic reading of history by the pupils. Such books as Edward Eggleston's *First Book in American History* and Mowry's *First Steps in the History of Our Country* are valuable for systematic reading in these grades. The pupils should also be encouraged to read biographies, provided they can be obtained. A good illustration of biographies suited to these grades is found in Elbridge S. Brooks's *Columbus, Franklin, Decatur and Grant*, and Louise Putnam's *Life of Abraham Lincoln*.

Thus far these suggestions have dealt only with American topics. In some schools it may be unwise to go beyond these, but whenever the capacity of the pupils and the work in the course of study will allow it, the children of the intermediate grades, especially of the fourth and fifth, should obtain some knowledge of other people. If the pupils can obtain the books, they should read during this time the following and as many more as opportunity will permit: Jane Andrews's *Ten Boys on the Road from Long Ago to Now*, Guerber's *Story of the Greeks*, *Story of the Romans* and *Story of the Chosen People*. These are typical of a number of other works of similar nature, which can be used at this time to great advantage. The reading of this period should also include considerable biography, not only of Americans, but of the great men of other nations. Particularly suitable for these grades are Sarah Bolton's *Lives of Girls Who Became Famous* and *Lives of Poor Boys Who Became Famous*. Many other books

of a like nature are easily obtainable, and in towns and cities school libraries are usually well supplied with material of this sort. If the pupils cannot obtain books, it is of great advantage in the history work for the teacher to possess them and read from them. The memory games during this part of the work should be emphasized, and a large number of extracts from poems, orations and other utterances of public men should be memorized, care being taken to see that the pupils understand a selection before learning it.

GRAMMAR GRADES. *Text-books.* The systematic study of history usually begins in the seventh or eighth grade, where the text-book is introduced, and it is at this point that the teacher frequently meets her greatest difficulty. The book should be carefully studied by the teacher, its plan ascertained and the difficult points discovered. This should be done before any work is begun with the class. When the teacher is familiar with these difficulties, she should plan her work so as to remove them as far as possible from the pupils. This can be done first by teaching the pupils how to study history from a text-book. A good plan is to use the book in class for a few lessons, asking the pupils to read and discuss the paragraphs assigned, pointing out to them in this way what they are expected to retain from their study. They should learn the facts and the relation of these facts to one another, but they should not attempt to commit the text to memory. Care should also be taken in the assignment of lessons so that the important paragraphs may be properly emphasized and the unimportant ones passed over lightly. In case the advance lesson contains any point that the pupils will have difficulty in understanding, the matter should be explained at the time of the assignment of the lesson. If other works are to be consulted, specific directions for their reading should be given. These directions should often include the page and the paragraph of the work to which the pupils are referred. The teacher should so plan the recitation as to make the history appear a live subject. In this way the interest of the pupils will at once be secured and retained.

Cause and Effect. History is a logical sequence of events, each depending upon certain causes and becoming a cause upon which events that follow are based; therefore, history should be studied from the standpoint of cause and effect. In proceeding according to this plan, special

emphasis should be placed upon the relation of geography to history. The teacher should lead the pupils to see that all great movements of history have rested upon geographic conditions and have been determined by them. A good illustration is the relation of the geography of North America to its settlement by the English and French colonists. Why did the French penetrate so much farther inland and range over so much larger territory than the English, during the same period? Why did the English settle in compact communities, while the French failed to establish many settlements? The answer to these questions is based very largely upon the geographical conditions. The Saint Lawrence formed a waterway leading far inland, by means of which the Great Lakes and the Mississippi Valley were reached with comparative ease, while the barrier of the Appalachian Mountains was an obstruction that the English colonists could not overcome for more than a century. Again, the purpose that led to colonization by each of these nationalities was an important cause in determining their method of life in the New World. The English came because they wished to establish a home wherein they would be free from all restrictions in carrying out the form of worship that they believed to be true. The French were actuated by the desire to acquire wealth through trading with the Indians, and they could not do this successfully if they remained in settled communities and devoted their time to tilling the soil. All events are susceptible of similar treatment, and the connection between cause and effect should never be overlooked.

Maps. Maps should be constantly used in connection with the text-book in history, and it is an advantage to the class if they have been used in the lower grades in connection with some of the narratives. It is a good plan to have the pupils construct the map as the study proceeds. When outline maps are used, this can be done without consuming much time, and it is of great assistance in enabling the pupils to understand the geographic relations.

Dates. Only the important dates should be memorized, such as the discovery of America by Columbus, the settlement of Jamestown, the landing of the Pilgrims, Braddock's expedition and the capture of Quebec by the English. The tendency is to have the pupils memorize too many dates, and this is liable to lead to confusion.

Outlines. The skilful teacher will either con-

struct for her class or direct them in the construction of an outline of the subject as the study proceeds. These outlines should not be elaborate, but they should show the relation of one event to another, should include the dates to be memorized and should be so constructed as to form the basis of review lessons.

Government. The underlying principles of government should be taught in connection with the history in the eighth grade, and these should be discussed and explained as they are reached in the regular course of study, as the difference between the royal and proprietary governments in the colonies previous to the Revolution. The difference in political principles which arose between the colonies and Great Britain and finally led to the Revolutionary War should be thoroughly discussed, and so much of these principles as is necessary to give the pupils a clear understanding of the points at issue should be learned.

Wars. In the study of wars the causes leading to the war and the results arising from it are far more important than the military campaigns. The tendency is to place too much stress upon the campaigns and battles, consuming so much time in this branch of study that but little time is left for the study of the more important features. In general, the military history of wars should be studied by campaigns. One campaign can be thoroughly studied as a type and the others passed over lightly. A good type is Burgoyne's campaign in the Revolutionary War, the study of which should include the purpose for which it was organized, the army with which he started, the conditions of the country through which he passed, the causes that led to his defeat and the results following his capture. The campaign terminating in the Battle of Gettysburg in the Civil War is also excellent for systematic study. Minor battles should usually be ignored, unless they constitute the beginning of a chain of events that lead to important results.

Supplementary Work. No text-book contains a sufficiently full account of American history to make the subject interesting, and it should be supplemented by additional reading and research. To this end the teacher of history should be able to place before the pupils such reference works and other books related to the subject as will enable them to follow out the study along various lines. Many of these works partake of the nature of fiction, but they are no less valuable. The libraries are so well stocked

with them that the problem before the teacher is one of selection. A good illustration of what such a list of books should contain is given herewith: Samuel Fallows's *Story of the American Flag*; James Baldwin's *Discovery of the Old Northwest*; Elbridge S. Brooks's *Century Book of Famous Americans*, also his *Century Book of the American Revolution*; Charles Carleton Coffin's *Boys of '76* and *Old Times in the Colonies*; John Fiske's *The War of Independence*; Guerber's *Story of the Great Republic*; Reuben Goldthwaites's *The Colonies*; Albert Bushnell Hart's *Formation of the Union*, and Woodrow Wilson's *Division and Reunion* (these last three books should be on every teacher's desk); O. P. Austin's *Uncle Sam's Secrets* and Eva March Tappan's *England's Story*.

The teacher will get valuable assistance from Channing and Hart's *Guide to American History*, Allen's *Topical Studies in American History*, Brigham's *Geographic Influences in American History*, McCoun's *Historical Geography*, McMurry's *Special Method in History* and Hinsdale's *How to Study and Teach History*.

Hitchcock, EDWARD (1793-1864), an American geologist, born in Deerfield, Mass. At the age of twenty-two he became principal of Deerfield Academy, which position he held for three years. His first work, which brought him into public notice, was his compilations of the calculations for the *Farmers' Almanac* and *Nautical Almanac*. After four years as pastor of a Congregational church, he became professor of chemistry and natural history in Amherst College and later became president of Amherst and also filled the chair of natural theology and geology, which position he held for ten years, being responsible to a great degree for the progress made by the institution at that time. He was recognized at one time as one of the leading authorities on geology in the United States and he did much to popularize the subject. The American Geological Society was formed at his suggestion, and he was its first president. Some of his important works are *Geology of the Connecticut Valley*, *The Religion of Geology and its Connected Sciences*, *Religious Truths Illustrated from Science*, *Religious Lectures on the Peculiar Phenomena of the Four Seasons* and *A Wreath for the Tomb*.

Hitchcock, ETHAN ALLEN (1835-1909), an American politician, born in Mobile, Ala. He settled in Saint Louis as a merchant and in 1866 became a partner in the commission house of Oliphant & Company in China. He retired in

1872 and returned to the United States two years later, becoming interested in various manufacturing, mining and railway enterprises. He was made minister to Russia in 1897 and was the first American ambassador to that country. President McKinley appointed him secretary of the interior in 1898 and he was reappointed in 1901 by President McKinley and President Roosevelt, and again in 1905. He was a member of the board of trustees of the Carnegie Institution, Washington, at its foundation.

Hittites, a Canaanitish nation first mentioned in connection with Abraham, who bought the field and cave of Machpelah from them. There are notices of them in Palestine during and after the captivity. Egyptian and Assyrian inscriptions seem to indicate that the nation consisted of a confederacy ruled by a number of chiefs. At one time a Hittite empire extended over a large area in Asia Minor and Syria and was constantly at war with Egypt, fighting great battles with Seti I and Ramesses II.

Hives, *hivcz*, the common name for urticaria, a disease which appears in white, swollen patches on the skin, that turn red after the patient scratches them. They are accompanied by itching which, in severe cases, becomes almost intolerable. The attacks appear and disappear with great suddenness. Local applications of a solution of baking soda will sometimes relieve the itching, but the cure comes by the removal of the causes, which are usually from some disturbance of the system, such as indigestion, caused by the eating of fish, pork or some fruits. Such local causes as the stinging of nettles will in some persons produce an attack of this disease, which is therefore known as *urticaria*, or *nettle rash*. A similar disease is seen in the bites of such insects as mosquitoes and fleas.

Hoang-Ho or **Hwang-Ho**, *hwahng'ho* (Yellow River), a large river in China, the sources of which are in mountains in the Kuku-Nor territory, north of Tibet. It flows in a winding course in a generally easterly direction into the Gulf of Pe-chi-li. Its length is estimated at about 2600 miles, and it drains an area of probably 400,000 square miles. The Hoang-Ho is navigable only a short distance from its mouth. It derives its name from the vast quantities of yellow earth held in a state of solution by its waters. This dirt, being deposited, raises its bed to such an extent that it frequently overflows, causing great loss of life and property. It is the second river in China in size, the Yang-tse-kiang being larger.

Hoar, *hore*, EBENEZER ROCKWOOD (1816-1895), an American jurist, born at Concord, Mass. He was graduated at Harvard in 1835 and was admitted to the bar. In 1849 he became a judge of the court of common pleas and ten years later was made justice of the state supreme court. In 1869 he was chosen attorney general of the United States, was one of the representatives of the United States in the conference which framed the treaty of Washington and was a member of Congress from 1873 to 1875.

Hoar, GEORGE FRISBIE (1826-1904), an American statesman, born in Concord, Mass. He was graduated at Harvard, began the practice of law in 1849, entered politics as a Free-Soiler, joined the Republican party at its organization, was elected to the legislature in 1852 and was a member of Congress from 1869 to 1877. He served on the Electoral Commission in 1877 and in the same year was elected to the United States Senate. He was four times reelected, becoming conspicuous as a consistent opponent of anti-imperialism, for notable service on important committees and as an eloquent orator.

Ho'bart, the capital of Tasmania, on the west shore of the Derwent River, 12 mi. from the coast. The most noteworthy buildings are the government house, the townhall, the public library, the parliament buildings, the royal theater and the museum and art gallery. As the harbor is excellent, the town is the center of a considerable trade, both import and export. There are manufactures of beer, flour, soap, jam, hats and barrels. As the temperature is never extreme and the region is very healthful, Hobart is a favorite Australian summer resort. Population in 1901, 31,317.

Hobbema, *hobe'ba mah*, MEINDERT (1638-1709), a Dutch painter. The place of his birth is unknown, but he spent most of his life at Amsterdam, where he probably studied under Ruysdael. During his lifetime his work was not appreciated, but since his death his landscapes have been ranked by critics second only to Ruysdael's among the painters of the Dutch school. Hobbema differed from Ruysdael in choosing as subjects the gentler aspects of nature, such as woodland scenes and quiet pools. In technical skill he probably excelled Ruysdael. His colors are rich and transparent and depict with especial brilliancy the beautiful effects of sunlight. Among his famous paintings are *The Water Mill*, in the Glasgow Gallery; *The Avenue near Middelharnis*, Holland, in the National

Hobbes

Gallery, London, and *The Ruins of Breberode Castle*, also in the National Gallery.

Hobbes, *hobz*, JOHN OLIVER. See CRAIGIE, PEARL RICHARDS.

Hobbes, THOMAS (1588-1679), an English moral and political philosopher. The most remarkable of his works is his *Leviathan, or the Matter, Form and Power of a Commonwealth*. In the history of the development of free thought in Europe, Hobbes holds an important place, and he was one of the first great English writers on government. He conceived the state of nature to be one in which all are at war with one another, and government as the result of a compact, suggested by selfishness, for the sake of peace and protection.

Hob'kirk's Hill, BATTLE OF. See CAMDEN, BATTLES OF.

Ho'boken, N. J., a city in Hudson co., on the Hudson River, at the base of the Palisades, opposite New York, of which it is a suburb, and adjoining Jersey City, on the Delaware, Lackawanna & Western, the New Jersey Junction, the Erie and the West Shore railroads. The city is the seat of Stevens Institute of Technology. There are also a public library, Saint Mary's Hospital and other prominent buildings. Hoboken is a great center for shipping, especially of coal, and is the terminus of many important transatlantic steamship lines. Among the important manufactures are machine shop products, leather goods, silk, wall paper and caskets. It was first called Hobocan Hacking and was a part of the patroonship granted to Marco Pauw in 1630. A house was built about ten years later, and a sparse settlement grew up. The present city really dates from 1804, when John Stevens, "the founder of Hoboken," bought the land and laid out the town. It was incorporated in 1849. In 1900 Hoboken was the scene of a terrible disaster; a fire at the wharves of the North German Lloyd Steamship Company caused a loss of 200 lives and of property valued at \$5,000,000. Population in 1905, 65,468.

Hobson, RICHMOND PEARSON (1870-), an American naval officer, born at Greensboro, Ala.; graduated from United States Naval Academy at Annapolis in 1889. At the opening of the Spanish-American War he was with Admiral Sampson's fleet. After the Spanish squadron was located in the harbor of Santiago Lieutenant Hobson conceived the plan of sinking a ship in the narrow entrance to the harbor and thus preventing the escape of the fleet. With seven companions he took the collier *Merrimac*

Hockey

into the entrance of the harbor on Friday morning, June 3, 1898, and sunk the boat in the channel, but did not accomplish the desired result. He was picked up by a Spanish boat



RICHMOND P. HOBSON

and retained as prisoner of war until exchanged a few weeks later. At the close of the war he was sent as a naval constructor to the Philippines. In 1903 he resigned from the navy. In 1908 he was elected to Congress.

Hock'ey or **Shinney**, a ball game in which each player is armed with a *hockey*, or *shinney*, *stick*, with which he tries to drive a small ball through the team of his opponents to their goal line. The field should be from 300 to 400 feet long and about 200 feet wide. At the beginning of the game the players, except one from each side, stand with their backs to their own goals and about one-third of the distance from them toward the center of the field. The ball is laid on the ground in the center of the field, and one player from each side stands facing his opponent's goal in the most favorable position to drive the ball towards it. Each player places the head of his hockey stick against the ball on the side opposite his opponent's goal, and at a given signal each of the players tries to strike the ball in the direction he wishes it to go. The game is now on, and every player must do his best under the rules to drive the ball over the goal line of his opponents. The rules of this game have not been rigidly formulated, as have those

of basket ball and football, and accordingly the game varies a great deal in different localities, especially in the method of starting. In fact, the game is one of the rough-and-tumble games that any number of boys play during the fall and winter months when they happen to meet in a suitable place. Hockey is also played on the ice, and this form of the game has been more carefully organized and is now a recognized winter sport in schools and colleges, many of which support hockey teams that play inter-collegiate matches with their neighbors. See **ATHLETICS**.

Hoe, an agricultural tool for cultivating and stirring the soil and for clearing out weeds. Hoes are of two kinds, those in which the blade is at right angles to the handle, used for turning over the earth, in place of the spade, and those in which the blade is almost in the same line with the handle, used almost exclusively for killing weeds and for stirring the surface of the earth.

Hoe, **RICHARD MARCH** (1812-1886), an American inventor, born in New York City. He was the inventor of the rotary printing press, having introduced in 1846 the Hoe Lightning Press. Later he and his brother invented the web-perfecting press, now in general use in the printing of newspapers. See **NEWSPAPER**; **PRINTING PRESS**.

Hofer, **ANDREAS** (1767-1810), a celebrated Tyrolean patriot. In 1796 he led a body of his countrymen against the French, and during the rest of his life was engaged almost continuously in defending his native country against the aggressions of surrounding nations. He gained notable successes against vastly superior forces and for a time, in 1809, actually freed his country from foreign yoke and acted as the head of the government. But soon his force was overpowered by French and Bavarians, and Hofer was betrayed into the hands of the French. After a court martial, he was condemned to death and shot by order of Napoleon.

Hoffman, **CHARLES FENNO** (1806-1884), an American poet and novelist, born in New York City. He edited the *American Monthly Magazine* and the *New York Mirror* and published *Greyslaer*, a novel, *The Vigil of Faith* and *Other Poems* and a number of songs. During the last thirty-five years of his life he was insane and was confined in an asylum.

Hofmann, *hofsman*, **HEINRICH** (1824-), a German painter, born in Darmstadt. He studied at Düsseldorf and Antwerp Academy and had Schadow for a teacher. After traveling in Italy he settled in Dresden in 1862. His pic-

tures illustrating scenes from the life of Christ are most widely known, as, *Christ Taken Prisoner* and *Christ in the Temple*.

Hofmann, **JOSEF** (1877-), a Polish pianist, born in Warsaw, of musical parentage. He studied with his father, then with Rubinstein. He made his début when six years old, toured Europe at nine and came to America in the following year. Thereafter he retired, reappearing at Dresden in 1894, and has since made several successful Continental and American tours.

Hog, a common domestic animal, belonging to the same family as the boar. The head is prolonged into a pointed or truncated snout; the feet have four toes, two of which reach the ground, and the skin is very thick, mostly covered with stiff bristles. The common hog in a tame state is almost universal, except in very high latitudes. The prevailing color of the domestic animal is a dull yellowish white, sometimes marked irregularly with black and sometimes totally black. It is omnivorous in its habits, devouring almost any vegetable or animal substance. It is also very prolific, has usually two litters in a year, a litter consisting of from ten to twenty. Its flesh, known as *pork*, forms a material part of the food of mankind, though Jews are strictly enjoined not to eat it, and Mohammedans agree in this prohibition. Pork takes salt better than almost any other meat, and hence it forms an important article in military and naval stores. The lard of the hog is used in a variety of preparations, and the bristles are used in large quantities in the manufacture of brushes, while the skin, when tanned, is used by saddlers and bookbinders. The hog is erroneously looked on as a peculiarly stupid and gluttonous animal; it has also an undeserved reputation for filthy habits, but the too common filthiness of pigsties is more the fault of the owner than the tenant. It wallows in the mire, but this is a peculiarity of all animals having a thick skin, and they do it to cool themselves and provide a protection against insects. The wild boar, from which most of our domesticated varieties are derived, is found in most parts of Europe and Asia. In size the wild animal considerably exceeds the domesticated hog; the legs are longer and more muscular, and the back is therefore much higher. See **LARD**; **PORK**.

Ho'garth, **WILLIAM** (1697-1764), an English painter and engraver, born in London. He began his career as a silversmith, making designs for plates. He made many designs of engrav-

ings, the most important of which were *Masquerades and Operas* and illustrations to Butler's *Hudibras*, which brought him fame. His ambition was to be a line engraver, but in 1724 he took up the study of painting. Among his successful series of paintings are *The Harlot's Progress*; *A Rake's Progress*; *Marriage à la Mode*, his most famous work, and another, *Industry and Idleness*, the last of which consists of engravings. In his work Hogarth had a definite purpose to fulfill, and this was to represent the vices and foibles of society. His paintings are better than his engravings. He also succeeded in portraits, the best of which is one of himself with his dog. Others of his works are *Southwick Fair*, *Midnight Modern Conversation*, *The Distressed Poet* and *Sigismunda Weeping over the Heart of her Husband*.

Hogs'head, an obsolete measure of capacity in the English system, containing 63 old wine gallons or 52½ imperial gallons. It varied in different times and places and for different substances. For beer it was 54 gallons, for rum, 40 to 50 gallons, for brandy, 45 to 60 gallons. In the United States, the measure is still in use, being equivalent to 63 American gallons or 52.485 imperial gallons; for tobacco it varies from 750 pounds to 1200 pounds in different states.

Hohenlohe-Schillingsfürst, *ho'en lo'e shil'-lings fürst*, CHLODWIG KARL VICTOR, Prince of (1819-1901), chancellor of Germany. In 1869 he became prime minister of Bavaria, and he was vice-president of the first imperial parliament in 1871. He was sent as German ambassador to Paris in 1874 and was a member of the Congress of Berlin in 1878. In 1894, on the resignation of Caprivi, he became chancellor of the Empire, and he held this office for six years.

Hohenstaufen, *ho'en stow'fen*, the dynasty which ruled Germany from 1138 to 1254. The first of the House was Conrad III, who came to the throne on the death of Lothair of Saxony. The other kings of the line were Frederick I, Barbarossa; Henry VI; Otho IV; Frederick II, and Conrad IV, whose death in 1254 brought the rule of the House of Hohenstaufen to an end. The Hohenstaufens were, for the most part, strong kings, and the imperial title was with them something more than a name. The two Fredericks were among the most remarkable of medieval sovereigns.

Hohenzollern, *ho'en tsole'urn*, a princely family of Germany, now represented by the

royal family. It dates from about the ninth century, and its history consists of an account of the several branches into which at various times it was divided. In 1415 the representative of the younger line, Frederick VI, was made elector of Brandenburg and thus founded the present imperial dynasty of Prussia. See PRUSSIA, sub-head *History*.

Holbein, *hole'bine*, HANS, the Elder (1460?-1524), a German painter, the father of the famous Hans Holbein. Not much is known of his life. He was born at Augsburg and in 1499 went to Ulm and later to Frankfort. His style is founded on the models of the early Flemish school, but he shows traces of Italian influences in his later works. All the works of his early period show the Flemish influence, and among these are *Virgin and Child with Two Angels*, *Virgin and Child Enthroned with Angels*, *Coronation of the Virgin*, *Nativity*, *The Last Supper*, *Expulsion of the Jews from the Temple*, *Crucifixion* and an *Entombment*. To the later period, in which the Italian influence is evident, belong *Life of Saint Paul*, *Saint Catharine*, *Martyrdom of Saint Sebastian* and *Fountain of Life*.

Holbein, HANS, the Younger (1497-1543), an eminent German painter, born at Augsburg, where he was first taught by his father, who was also a painter. His youth was spent in Basel, but at the beginning of the Reformation he went to England, where letters from his friend Erasmus, whose *Panegyric on Folly* he had illustrated by a series of drawings, procured him the patronage of the chancellor, Sir Thomas More. He was appointed court painter by Henry VIII; and in the Windsor collection he left portraits of all the eminent Englishmen of the time. The most celebrated of his pictures is the *Madonna of the Burgomaster Meyer* at Darmstadt. Other works are *Passion Scenes*, *The Ambassadors* and various excellent portraits.

Holden, EDWARD SINGLETON (1846-), an American astronomer, born at Saint Louis, Mo., and educated at Washington University and the United States Military Academy. After a term of eight years as professor of mathematics at the naval academy and four years as director of the Washburn Observatory at Madison, Wis., Holden became president of the University of California in 1885 and later director of the Lick Observatory on Mount Hamilton in California. Here, surrounded by all the conveniences which modern science could furnish, he did his most important work, which

is considered of great value to the science of astronomy. Among his works are an *Index Catalogue of the Nebulae*, *A Life of Sir William Herschel*, an *Astronomy* (with Newcomb) and *Essays in Astronomy*.

Holder, CHARLES FREDERICK (1851-), an American naturalist and author, born at Lynn, Mass., of Quaker parents, and educated at the Friends' School in Providence, R. I. He entered the United States Naval Academy at Annapolis, but resigned before his graduation. In 1871 he became assistant curator of zoölogy in the American Museum of Natural History in New York, and his important scientific researches led to his election to the New York Academy of Sciences and other famous scientific societies. He traveled extensively in America, collecting specimens for the museum, and finally removed to California, where he took a prominent part in the educational affairs of the state, becoming president of the Pasadena board of education and later, professor of zoölogy in Throop University. Among his published works are *Marvels of Animal Life*; *Elements of Zoölogy*; *The Pasadena Highlands*; *Charles Darwin's Life and Work*; *Louis Agassiz, His Life*; *Stories of Animal Life*; *Big Game at Sea*, and others.

Hol'iday, any day set apart as a religious or national festival; in a general sense, a day or a number of days during which a person is released from his every-day labors. In the United States the principal holidays are New Year's Day, Washington's Birthday, Decoration Day, the Fourth of July, Labor Day, Thanksgiving Day and Christmas; but nearly every state has its particular festivals and holidays. There is no national legal holiday in the United States, each state controlling this matter for itself.

Holinshed or **Hollingshead**, *hol'inz hed*, RAPHAEL (?-1580), an English writer, known chiefly as the author of the famous *Chronicle*, or the history of England, Scotland and Ireland, which furnished the material for many of the dramas of the Elizabethan time, notably of Shakespeare's *Macbeth*, *King Lear* and *Cymbeline*, besides parts of others.

Holland. MICH., a city in Ottawa co., 25 mi. s. w. of Grand Rapids, on the Pere Marquette railroad, and at the head of Black Lake, which affords a good harbor. It is in an agricultural region which was once a lumber district and has an extensive grain trade. The industries include flour and planing mills, tanneries, beet sugar factories, pickling plants and manu-

factories of wood-working machinery, launches, furniture, baskets and other articles. The place was settled by the Dutch in 1847, and the present inhabitants are largely of Dutch descent. It is the seat of H^{OL} College and of the Western Theological Seminary, both under the Reformed Church. A number of summer resorts are situated near the city, on Black Lake. Population in 1901 3966.

Holland, JOSIAH GILBERT (1819-1881), an American author and editor. In 1844 he graduated at the Berkshire Medical College, but he never succeeded in gaining a practice. At the age of thirty he connected himself with the *Springfield Republican*, and as he exhibited a remarkable aptitude for journalism, the paper soon became vastly popular. In 1870 he founded *Scribner's Monthly*, which, under another ownership, is now the *Century Magazine*. Among Holland's books, many of which became very popular, are the novels *Nicholas Minturn* and *Arthur Bonnicastle* and the poems *Bittersweet*, *Kathrina* and *Garnered Sheaves*.

Holland, KINGDOM OF. See NETHERLANDS, THE.

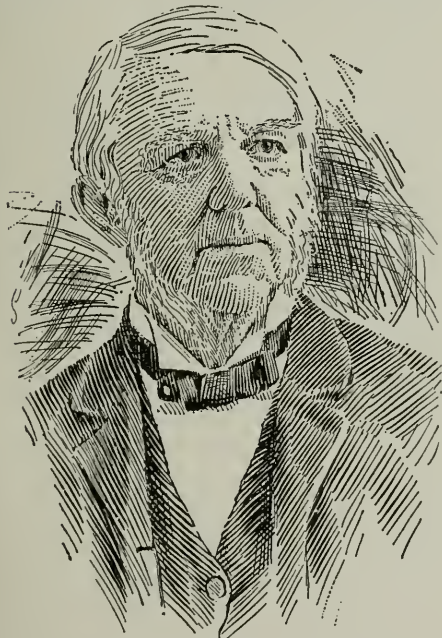
Holly, a genus of plants embracing a number of evergreen trees or shrubs. The common European holly is a handsome, conical evergreen tree, growing to the height of twenty or thirty feet. Its leaves are dark green, shining and leathery, abundantly armed with prickles on the lower branches, but free from them on the upper branches and on very old trees. The flowers are white, appearing in May; the fruit is red, ripening in September and remaining on the tree all winter. A good many varieties are known, distinguished by the shape and color of the leaves, which are sometimes spotted or edged with yellow. Holly is excellently adapted for hedges and fences, as it bears clipping. The wood is hard and white and is employed for turnery work, knife handles and similar articles. Among the Romans it was customary to send boughs of holly to friends with new year's gifts, as emblematic of good wishes; and it is used to decorate houses at Christmas. The American holly is widely spread throughout the United States. It sometimes attains a height of eighty feet, with a trunk four feet in diameter.

Hol'lyhock, a biennial plant, native of China, a frequent ornament of gardens. There are many varieties, with single and double flowers, showing tints of yellow, red, purple and dark purple, approaching to black. Hollyhocks grow to the height of eight feet or more,

and some of the double ones are quite as beautiful as dahlias and chrysanthemums.

Holman. WILLIAM STEELE (1822-1897), an American jurist and politician, born in Dearborn County, Ind., and educated at Franklin College. He became a lawyer and held several state judicial offices and in 1851 was a member of the legislature. In 1859 he was elected to Congress, and with two or three exceptions, as in 1876 and 1878, retained that position. He was known as "the watchdog of the treasury" and "the great objector," from his invariable opposition to wasteful public expenditures.

Holmes, OLIVER WENDELL (1809-1894), an American author and physician, born at Cam-



OLIVER WENDELL HOLMES

bridge, Mass. During his early years he spent much time in his father's library, and the great quantity of fragmentary reading which he did "in books rather than through them," as he himself said, had a marked effect on the writings of his later life. He was graduated from Harvard in 1829, in the class which he himself made famous in later years by his yearly poems at the reunions. After studying law for a time, he turned to medicine, at first with little seriousness. He became deeply interested, however, and the years during which he studied medicine in Paris were most industriously spent. His degree of M.D. was received in 1836 and he settled down to practice medicine in Boston.

While yet in college, Holmes had written numerous poems which, while they were not of the highest order of merit, included such popular and humorous poems as *The Spectre Pig* and *The Height of the Ridiculous*; he had also won a taste of fame by the publication in the year following his graduation from Harvard of *Old Ironsides*, which, by its remarkable popularity and the feeling it stirred up throughout the country, had the effect of compelling the secretary of the navy to countermand the order for the destruction of the famous frigate *Constitution*.

It was not until 1836 that Holmes published his first book of poems. He realized that the appearance of a volume of poetry in the same year that he started in to practice medicine would probably have a most unfavorable effect on his practice, as people might hesitate somewhat before applying to a poet for prescriptions. His heart was set, however, on a literary career, even more than on a medical, and he was willing to sacrifice something for it. In 1839 he was given a position as lecturer in Dartmouth College and in 1847 gave up his practice entirely and became professor of anatomy at the Harvard Medical School, a position he filled until 1882. Meanwhile, in 1840, he had married Amelia Lee Jackson, with whom his life was most happy. Various medical papers, some of which were of great importance in the profession, came from Holmes's pen from time to time, and his poems written to celebrate every special occasion in his beloved city of Boston had made him locally famous as a wit. It was not until the founding of the *Atlantic Monthly* in 1857, however, that Holmes became widely famous. To this newly-founded magazine he contributed his papers known as the *Autocrat of the Breakfast Table*, which are up to the present day considered his masterpiece. It is simply talk in print, and this means a great deal when the talker is as brilliant and easy a conversationalist as was Doctor Holmes. This first series was followed by *The Professor at the Breakfast Table* and later by *The Poet at the Breakfast Table*. Three novels, *Elsie Venner*, *The Guardian Angel* and *A Mortal Antipathy*, added little to his fame, although the first two are still distinctly readable. After a visit to Europe in 1886 appeared *Our Hundred Days in Europe*, and when Holmes was eighty, he wrote a final autocrat series under the title of *Over the Teacups*. This last possesses little of the spontaneous charm of his earlier writings, but is

interesting as showing the change in his conversational methods and powers.

Among Holmes's best poems may be mentioned *The Chambered Nautilus*, *The Last Leaf* and the widely-known *Wonderful One-Hoss Shay*. Whether it is as poet or a prose writer that Holmes is considered, it is the same qualities, his sprightliness, his geniality, his absolute sanity and his power of combining wit and pathos, which stand out most prominent, and these are the same qualities which in his own generation made Doctor Holmes the most popular of men.

Holmes, *hohmz*, OLIVER WENDELL, Jr. (1841-), an American jurist, born at Boston, the son of Oliver Wendell Holmes, the noted poet and essayist. He was graduated at Harvard and from Harvard Law School, served for two years in the Civil War, taking part in the battles of Ball's Bluff, Antietam and Fredericksburg, and then engaged in practice in Boston, where he became editor of the *American Law Review* and, in 1882, professor of law in Harvard Law School. In the same year he was appointed associate justice and in 1899 chief justice of the state supreme court. In 1902 he was appointed associate justice of the Supreme Court of the United States. He is the author of several books on the law and once edited Kent's *Commentaries*.

Hol'othu'rian. See SEA CUCUMBER.

Holst, *hohlst*, HERMANN EDUARD VON (1841-1904), a German-American historian, born in Livonia of German parents. He was educated at Heidelberg, taught for a time in Saint Petersburg and then emigrated to the United States. After some years spent in New York in teaching and in newspaper work he returned to Germany, was made professor in the University of Strassburg and later in the University of Freiburg. In 1892 he was made the head of the department of history in the University of Chicago, a position which he held until 1900, when ill health compelled him to retire. Among his writings are *The Constitutional and Political History of the United States*, *The Constitutional Law of the United States*, and *John C. Calhoun*, in the American Statesmen Series.

Holt, JOSEPH (1807-1894), an American jurist, born in Breckenridge, Ky., and educated at Saint Joseph's College and Center College, in his native state. He studied law and began practice, but in 1835 moved to Mississippi, where he gained fame as an orator and poli-

tician. Under President Buchanan he became postmaster-general and later secretary of war. At the opening of the Civil War he supported the Union and was made judge advocate general at the head of the department of military justice. He presided over the trial of Lincoln's assassins. He retired with the brevet rank of major general.

Holy Alliance, a league concluded at Paris, in September, 1815, between Alexander I of Russia, Francis of Austria and Frederick William III of Prussia. It consisted of a declaration, that, in accordance with the precepts of the gospel of Jesus Christ, the principles of justice, charity and peace should be the basis of their internal administration and of their international relations, and that the happiness and religious welfare of their subjects should be their great object. Its real aim, however, was to maintain the power and influence of the existing dynasties, and Metternich, the Austrian minister, gradually obtained the chief authority. The events of 1848 broke up the Holy Alliance.

Holy Fam'ily, a name in art, applied to representations of the Mary and the infant Christ, with their attendants. In the sixth century the Byzantine school introduced a type in which Jesus is seated in the lap of the Virgin Mary. Later, the attendant angels were added. A new type was introduced by Cimabue and Duccio, in whose pictures are throne-bearing and adoring figures. Toward the last of the Middle Ages still other figures were represented in the pictures of the Holy Family, such as Saint Anna, the mother of the Virgin; Saint Joseph; the infant John the Baptist, and Saint Catherine. Of all subjects, that of the Madonna and child, unknown in the early Middle Ages, came into the greatest prominence, becoming the favorite theme of the Italian painters of the Renaissance.

Holy Grail. See GRAIL, THE HOLY.

Holy Land. See PALESTINE.

Holy League, the name given to several different alliances in European history, the most important of which was formed in 1576 by the ruling house of France, the pope, the king of Spain and the Parlement of Paris against the Huguenots. See FRANCE, subhead *History*.

Holyoke, *hole'yoke*, MASS., a city in Hampden co., 8 mi. n. of Springfield, on the Connecticut River and on the Boston & Maine and the New York, New Haven & Hartford railroads. The river here has a fall of 60 feet, and a dam 1000 feet long has been constructed, so that the city now has probably the most

extensive water power in New England. Holyoke is especially noted for its paper mills, but there are also manufactories of cottons, woollens, thread, silk, alpaca, machinery, school supplies and various other articles. The city contains a public library, a city hospital and the House of Providence Hospital. The city has been one of the pioneers in the east in introducing a system of municipal lighting. Holyoke was settled chiefly by Irish people in the last part of the seventeenth century, and it was for a time called Ireland Parish. It was part of West Springfield from 1786 to 1850, and in 1873 it was chartered as a city. Population in 1905, 49,934.

Holyoke, MOUNT, a steep ridge in Massachusetts, 5 mi. s. e. of Northampton, 955 feet above sea level. The view obtained from this summit is one of the finest in the east.

Holy Roman Empire, the name given to the State created by Charlemagne, the assumption being that it was a development of the old Western Empire and that Charlemagne was the successor of the Roman emperors. The title *Roman Empire* was first used in 962, when Otho the Great was crowned by the pope, and the word *Holy* was added by Frederick Barbarossa. In theory, all of the Christian countries of western Europe formed part of the Holy Roman Empire, but in reality only Italy and those countries which acknowledged the superiority of the king of Germany belonged to it. The Hohenstaufen emperors possessed something like imperial power, because they were strong monarchs individually, but after their time the term came gradually to be merely an honorary title. In 1804 Francis II took the title of emperor of Austria, and two years later he gave up that of Holy Roman Emperor.

Holyrood Palace, the ancient royal palace of Scotland, in Edinburgh. It occupies the site of the old Augustinian abbey of the Holy Rood, which was built by King David I in 1128 at the place where, tradition says, he was saved from a pursuing stag by a miraculous cross, or rood, which came between him and the animal. The palace was rebuilt between 1671 and 1679 by King Charles II of England. It is interesting from a historical standpoint, as the place where Mary Queen of Scots resided and where Rizzio was murdered in 1566.

Holy Sepulcher, *sep'ul kur*, CHURCH OF THE. See JERUSALEM.

Holy Spirit Plant, an orchid of Central America, known, also, as the *dove plant*, from

the resemblance of the united stamens and pistils of the flower to a dove hovering with expanded wings, somewhat like the conventional dove seen in artistic representations of the Holy Ghost. The round, sweet-scented flowers are a creamy white, dotted with lilac on the base of the lip, and are borne in a spike.

Holy Water, in the Roman Catholic Church, water which has been blessed by a priest for religious uses. It is sprinkled on the worshippers and the things used in the church and is employed at funerals and other special services.

Homage, *hom'aje*, in feudal law, a formal acknowledgment and acceptance of the duties of a vassal, made by a feudal tenant to his lord. The tenant, being ungirt and uncovered, kneeled and held up both hands between those of the lord and there professed himself to be his lord's vassal. He then received a kiss from the lord.

Homeopathy, the name of a system of medicine introduced by Samuel Hahnemann of Leipzig. It is a system founded upon the belief that drugs have the power of curing morbid conditions similar to those they have the power to excite, an old belief long ago expressed in the Latin phrase, *similia similibus curantur* (like is cured by like). That the smaller the dose, the better will be its effects is another principle which, however, is not now so generally accepted as formerly by physicians of this school. While the principle has often been carried to ridiculous extremes, the idea has gained a remarkable foothold and has doubtless modified the size of doses given by practitioners of other schools.

Homer, the earliest named Greek poet, to whom ancient tradition assigned the authorship of the *Iliad* and the *Odyssey*. Of Homer's life and personality nothing is known, and it has been questioned whether such a person ever existed. Several ancient biographies of Homer are preserved, two of which, their titles state, were written by Herodotus and Plutarch, respectively. It is certain, however, that the statements of authorship are false, and the biographies are valuable only because they show what was the ancient popular tradition concerning the poet. Many towns claimed the honor of being his birthplace, and the names of seven are preserved in an epigram beginning,

"Seven rival towns contend for Homer dead,
Through which the living Homer begged his bread."

Of these towns, Smyrna seems to have had the strongest claim, Chios coming next. At the

latter town was a clan of bards called Homeridae, who transmitted the epics from father to son and claimed Homer as their founder. In one of the *Homeric Hymns*—poems addressed to the gods and because of their similarity in style ascribed to Homer, but probably for the most part of later date—the author describes himself as the “blind bard of rocky Chios.” The tradition of Homer’s blindness was universally accepted. Ancient writers mention the name *Homer* as a



HOMER

pseudonym of the poet, and various interpretations of it are given, the most probable being that it meant “one who puts together.” This gives color to the theory that Homer was not an original poet, but merely a compiler of current lays. The general belief of antiquity seems to have been that Homer was born in Smyrna, lived some time in Chios and was buried in Ios. His date has been variously placed between the beginning of the twelfth century and the beginning of the seventh century B. C. The dialect and a few local allusions indicate that the *Iliad* and the *Odyssey* originated on the Ionian coast of Asia Minor and the Aegean Islands. Lycurgus is said to have brought them to Sparta, and we hear of the recitation of them by rhapsodists about 600 B. C. Solon regulated such recitation at Athens, and the Tyrant Pisistratus had the poems edited by a commission and arranged in what is practically their present form. Perhaps the lays or rhapsodies had previously been sung separately and were then for the first time united into two poems, the *Iliad* and the *Odyssey*.

Other poems of the epic cycle had been attributed to Homer, but the critics rejected all except the *Iliad* and the *Odyssey*, which by all but a small minority were considered as genuine and as the work of one author. The frequent allusions and quotations in Greek literature prove the high estimation in which the *Iliad* and the *Odyssey* were held by the Greeks themselves. Every city of importance had its civic edition, from which copies could be made for private individuals. A famous edition was that prepared by Aristotle for his pupil, Alexander the Great.

Homer, WINSLOW (1836–), an American painter, born in Boston. His first work consisted of sketches for magazines, and during the Civil War he was an artist for *Harper's Weekly*. In New York he showed his first great picture, *Prisoners from the Front*, which brought him prominently before the public. A great many of his works are genre subjects, such as *Home*, *Sweet Home*; *Cotton Pickers*; *In the Field*. He also painted many marine pictures, and his fame rests principally on these. Among them are the *Life Line*, *Eight Bells*, *Launching the Boat*, *The Tempest*, *The Lookout*, *A Northeaster*, *The Maine Coast* and *The Gulf Stream*.

Home Rule, in British politics, a measure advocated especially in regard to Ireland, the leading feature of which is the establishment of a native parliament in Ireland, to conduct all local and internal legislation, leaving the general political government of the Empire to an imperial Parliament. The movement originated in the formation of the Home Government Association at Dublin, in 1870. At the general election of 1874 the party succeeded in sending 60 Home Rule members to Parliament, and in 1886 this was increased to 86 members under Charles Parnell, who then held the balance of power between the Liberals and Conservatives. The conversion of Mr. Gladstone and many members of the Liberal party to Home Rule principles, in 1886, added immense strength to the movement, but failed to carry through its program. The amelioration of economic conditions and the granting of local self-government under Balfour's Conservative administration, quieted the agitation for a time, but later it broke forth anew under such leaders as Justin McCarthy and John Redmond.

Homestead, *home'sted*, PA., a borough in Allegheny co., 8 mi. s. e. of Pittsburg, on the Monongahela River and on the Pennsylvania and other railroads. One of the largest steel plants in the United States, employing six thou-

Homestead Laws

sand men, is located here, as are also foundries, machine shops and glass works. The place was settled in 1871 and incorporated in 1880. From July to November, 1892, it was the scene of a great labor strike, in which there was considerable disorder. Population in 1900, 12,554.

Homestead Laws, acts concerning the securing and holding of lands and houses for homesteads or places of abode for families. These laws are both state and Federal, the purpose of the former being to protect those who have acquired homes against the claims of creditors, the homestead, to a certain value, usually being exempt from such claims, except those contracted before the property was recorded as a homestead.

The Federal laws relate to the appropriation of the public lands to those who will settle, cultivate and make permanent homes upon them. This privilege is open to any citizen or to any one who declares his intention of becoming a citizen, twenty-one years of age or the head of a family, the appropriation not exceeding 160 acres. Fees are required, rarely exceeding more than \$30, and title to the property is given after five years' residence and cultivation. Preference is shown to ex-soldiers or their heirs. Under these laws more than 85,000,000 acres have been transferred to homestead settlers. See **LANDS**, **PUBLIC**.

Homicide, *hom'y side*, the killing of one person by another, either through direct act, through instigation or through the omission of some act which would have prevented the killing. In this wide sense it includes manslaughter and murder (See **MURDER**), besides so-called justifiable homicide. In this article the term will be used only in the last sense. This includes killing by accident, in self-defense, by a public officer in conformity to a judicial sentence, by an officer in performing a legal duty, or by a person to prevent the commission of a serious crime. If committed without any fault on the part of the slayer, homicide is not punishable at law. The circumstances of the homicide, however, are always most carefully investigated to see that it was either absolutely necessary, or without evil intent or was without blame on the part of the slayer.

Homing Pigeon, *ho'ming pij'un*. See **CARRIER PIGEON**.

Hon'do. See **JAPAN**.

Honduras, *hon doo'ras*, a republican state of Central America, bounded on the n. by the Caribbean Sea, on the s. e. by Salvador and the Pacific

Honey

Ocean, on the s. w. by Nicaragua and on the w. by Guatemala. Its total area is about 45,000 square miles, nearly all of which is mountainous. The climate of the interior of the country is healthful, being moderate in temperature and not excessively humid. On the low east coast, the excessive heat and rainfall make life for the white race uncomfortable and dangerous. The mineral wealth of Honduras is very considerable and includes gold, silver, lead and copper. The country also has extensive forests, abounding in fine timber. The principal cultivated products are maize, beans, some wheat, rice, plantains and tobacco. Since 1880 the capital has been Tegucigalpa; the principal ports are Truxillo, on the Caribbean Sea, and Port San Lorenzo, on the Pacific. There is no communication by railroad between the Atlantic and Pacific coasts; transportation is by mule train, the distance of less than two hundred miles being covered in three weeks. The constitution of the state gives the legislative power to a congress of deputies, chosen one for each 10,000 persons. The country is divided, for administrative purposes, into fifteen departments, over each of which is a governor appointed by the president. There is a supreme court. The executive authority is in the hands of the president, elected by popular vote once in four years. Population in 1901, 544,000, exclusive of uncivilized indians.

Honduras, **BAY OF**, a wide inlet of the Caribbean Sea, bordered on the south by Guatemala and Honduras and on the west by British Honduras and Yucatan. Along its shores are the islands of Bonaca, Ruatan, Utila, Turneff, and numerous islets and reefs called cays.

Hone, a stone used in sharpening edged tools. The coarse varieties of hones are made of sandstone and are commonly called *whetstones*. The finer varieties are usually made of a stone formed from placing pine logs in the sea and leaving them until they turn to stone. Another variety of hone stone is called *novaculite*. The surfaces of the hone should be smooth and even, and fine stones should be lubricated with oil or water when used. In sharpening any tool upon the hone, the tool should be held firmly and moved back and forth without any rotary motion; otherwise the edge will be rounded and the desired result cannot be obtained.

Honey, *hun'y*, a sweet substance collected from flowers by bees and other insects for food for themselves or their young and considered a great delicacy by men. White clover and bass-

wood furnish very fine honey; buckwheat and other plants may yield as much, but the flavor is always governed by the plant, and in some cases it is not pleasant. Honey has been used for many centuries, and before the cultivation of sugar cane it took the place of sugar for many purposes for which that article is now used. See BEE.

Honey Locust, Sweet Locust or Black Locust, a forest tree belonging to the United States. The leaves are divided into numerous small leaflets, and the foliage has a light and elegant appearance. The flowers are greenish and are succeeded by long, often twisted pods, containing large, brown seeds, enveloped in a sweet pulp. This tree is especially remarkable for its formidable thorns, on which account it has been recommended for hedges.

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Hong Kong, an island off the southeast coast of China, belonging to Great Britain. It is at the mouth of the estuary that leads to Canton, from which it is 75 mi. distant. It is about 10 miles long, and its greatest width is 7 miles. The island is almost destitute of vegetation. Victoria, the capital, is situated on a beautiful bay and contains most of the population of the colony. There are many beautiful buildings and an excellent harbor, which is strongly fortified. Hong Kong is the center of the foreign trade of China and carries on a large trade with the other great countries. Among the articles of commerce are opium, flour, mercury, ivory, betel, cotton, amber, wools, salt and sugar. There are manufactures of sugar, cotton and vermilion, and among the native industries are ivory carving and metal working. The prosperity of the colony is due in a large measure to the large number of Chinese engaged in trade or in working building stone, which is one of the chief products of the island.

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Hooker, THOMAS (1586-1647), an American colonist and clergyman, one of the founders and the chief promoter of the Connecticut colony. He was born in Leicestershire, England, was educated at Cambridge and, entering the ministry, won distinction for eloquence and sincerity. Driven by persecution to Holland, he continued to preach, but in 1633 went to New England and settled in Cambridge. Three years later, owing to the pressure of population and to other causes, he moved with his congregation westward to the Connecticut valley, where, joined by others from Dorchester and Watertown, he established an English settlement at Hartford. Other settlements sprang up in the vicinity, but Hooker's influence was paramount in them all, and he was probably the author of the Fundamental Orders, which were promulgated in 1639. This was the first written constitution in American

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Hooker, MOUNT, one of the highest peaks in the Rocky Mountains in Canada, situated near the boundary between British Columbia and Alberta. Its altitude is estimated at 15,700 feet.

Hooker, RICHARD (about 1553–1600), an English clergyman and writer, born at Exeter. He studied at Oxford and in 1582 took holy orders. Hooker is most widely known for his celebrated book, *The Laws of Ecclesiastical Polity*, which placed him in the front rank of English writers upon ecclesiastical and political subjects. In it he presents his theory of the origin of government and its relation to the Church. It is an able defense of the Established Church in opposition to the Independents and Presbyterians, who were then gaining ground.

Hooker, THOMAS (1586–1647), an American colonist and clergyman, one of the founders and the chief promoter of the Connecticut colony. He was born in Leicestershire, England, was educated at Cambridge and, entering the ministry, won distinction for eloquence and sincerity. Driven by persecution to Holland, he continued to preach, but in 1633 went to New England and settled in Cambridge. Three years later, owing to the pressure of population and to other causes, he moved with his congregation westward to the Connecticut valley, where, joined by others from Dorchester and Watertown, he established an English settlement at Hartford. Other settlements sprang up in the vicinity, but Hooker's influence was paramount in them all, and he was probably the author of the Fundamental Orders, which were promulgated in 1639. This was the first written constitution in American

history. Hooker was a leading spirit in the councils of the New England Confederation.

Hooping Cough. See WHOOPING COUGH.

Hoop'oe, a European bird, related to the kingfishers and hornbill. It is about twelve inches long and has a fine crest of pale, cinnamon-red feathers, tipped with black. The upper surface of the bird is, on the whole, ashy brown; its wings are black with white bars, and its throat and breast are pale fawn, shading to



HOPOE

white, marked with black streaks and dashes on the abdomen. The hoopoe feeds on the ground, preying chiefly on insects, and is not particular about the cleanliness of its food. Large objects are rapped on the ground and usually tossed into the air before being swallowed. The birds fly well and run rapidly, and by the Mohammedans they are venerated as being the favorite birds of Allah.

Hoorne or Horn, PHILIPPE DE MONTMORENCY-NEVELE, Count of (about 1518-1568), a Flemish statesman and soldier. He held important posts under both Charles V and Philip II. As counselor of state he opposed Granvella and attempted to secure toleration for the Protestants. When Alva arrived in the Netherlands, Hoorne, although he had always remained true to the Spanish crown, was accused of treason, was given a trial before the Council of Blood and with Egmont was put to death.

Hoo'sac Tunnel, a tunnel through Hoosac Mountain, in the northwestern part of Massachusetts, 137 miles west of Boston. It is four and three-quarter miles long. The cross section

is twenty-four feet wide in the widest part and twenty-two feet eight inches high, and the tunnel carries two railway tracks. It is used by the Fitchburg division of the Boston & Albany railroad. Work on this tunnel was first begun in 1856, but was soon abandoned. It was resumed in 1862 under control of the state, and the tunnel was completed in 1873, at a cost of about \$11,000,000. Work was carried on at the same time from each end and from a shaft 1028 feet deep, which was sunk near the middle. This shaft is now used for ventilating. This is the longest tunnel in America.

Hoo'sick Falls, N. Y., a village in Rensselaer co., 27 mi. n. e. of Troy, on the Hoosac River and on the Boston & Maine railroad. It has good water power and the manufactures include agricultural implements, flour, cottons and woollens, shirts, paper and paper-making machinery. The place was settled in 1688 and was incorporated in 1827. Population in 1905, 5251.

Hop, a plant of the hemp family, a native of Europe, that also grows wild in the United States. The rough, twining stems grow from a perennial root and bear large-lobed leaves. The plant is cultivated for the sake of the catkin-like fruits, which are used to give to beer its bitter aromatic flavor. Hops are cultivated in yards. Here great poles are stuck into the ground early in the season, and three or four plants are trained to climb each. At the proper season the poles are taken down, the catkins are gathered into huge baskets and carried to a building, where they are dried and pressed into solid bales. In this condition they may be kept for years, if they are not allowed to grow moist. The cultivation of the hop is more carefully attended to in England, especially in the County of Kent, than in any other country; but hop growing is an important industry in the United States, Austria-Hungary and Germany, also. In 1901 the United States produced over 45,000,000 pounds, the greater part of the product coming from New York, Oregon, California and Washington, in the order named.

Hope, ANTHONY. See HAWKINS, ANTHONY HOPE.

Hopi, ho'pe. See MOKI.

Hopkins, ALBERT J. (1846-), an American lawyer and politician, born in DeKalb County, Ill. He graduated at Hillsdale (Mich.) College, studied law and began his practice at Aurora, becoming state's attorney of Kane

County in 1872. From 1885 to 1903 he represented his district in Congress, and in the latter year he was elected United States senator as a Republican.

Hopkins, JOHNS. See **JOHNS HOPKINS UNIVERSITY.**

Hopkins, MARK (1802-1887), an American educator, born at Stockbridge, Mass. He became professor of moral philosophy in Williams College, and later, president of that institution, which position he held for thirty-six years. During his administration the influence of the college was greatly extended, and it became widely known throughout the country as an institution of the first rank. Doctor Hopkins had a strong personality, which he impressed upon all students, and because of his influence in the development of character, as well as his power as a teacher, he ranked among the great educators of his time. Some of his best-known works are *The Influence of the Gospel in Liberating the Mind, Moral Science, The Law of Love and Love as Law* and *The Spiritual Idea of Man*.

Hopkins, STEPHEN (1707-1785), an American statesman, signer of the Declaration of Independence. He was born in Rhode Island, became a member of the general assembly in 1732 and served his state from that time almost continuously until his death. In 1751 he became chief justice of the superior court, four years later was elected to the governorship, and held that office nine times in the next thirteen years. He was a delegate to the Albany Convention in 1754 and from 1774 to 1780 was a delegate to the Continental Congress. During the Revolutionary period he published many pamphlets in behalf of the colonial cause.

Hopkinson, FRANCIS (1737-1791), an American statesman and author, a signer of the Declaration of Independence, born in Philadelphia. He was admitted to the bar in 1761. In 1776 he was a delegate to the Continental Congress. During the war for independence his patriotic writings powerfully influenced public sentiment, the best-known being *The Battle of the Kegs*, a humorous description in verse of an incident of the war.

Hopkinson, JOSEPH (1770-1842), an American lawyer, born in Philadelphia. He became a prominent lawyer, served four years in the House of Representatives and was appointed by President John Quincy Adams a district judge in Philadelphia, which position he occupied until his death. He is best known as the

author of *Hail Columbia*, written in 1798, at a time of great political excitement.

Hop'kinsville, Ky., the county-seat of Christian co., 75 mi. n. w. of Nashville, Tenn., on the Louisville & Nashville, the Illinois Central and other railroads. It is the seat of Bethel Female College and South Kentucky College, and the Western Kentucky Asylum for the Insane is located here. The city is now growing rapidly and is principally engaged in the handling and manufacture of tobacco, though it has a considerable trade in grain and live stock. The place was settled in 1797. Population in 1900, 7280.

Horace, *hor'ase* (65-8 B. C.), the common name of Quintus Horatius Flaccus, the greatest of Latin lyric poets, born at Venusia, in southern Italy. When Horace was about twelve years of age his father removed with him to Rome, where he received an excellent education, and six years later he went to Athens to complete his studies. After the assassination of Caesar, Brutus came to Athens, and Horace, along with other Roman youths, joined his army. He was appointed to a military tribuneship, was present at Philippi, and on the defeat of Brutus saved himself by flight. On the proclamation of an amnesty to the vanquished, Horace returned to Italy, but found his father dead, his paternal estate confiscated and himself reduced to poverty. He was, however, enabled to purchase a clerkship in the quaestor's office, which permitted him to live frugally and to cultivate his poetical talent. His poems procured him the friendship of Vergil and Varius, and to them he was indebted for his first acquaintance with Maecenas, who was the friend and confidant of Augustus Caesar and who expended his wealth for the encouragement of literature and the arts. Maecenas received Horace among his intimate friends and, after some years, presented him with a small estate in the Sabine hills, which was sufficient to maintain him in ease and comfort during the rest of his life. He had also a cottage at Tibur, and at Rome or at one of these country residences the latter part of his life was spent. Although he was ultimately introduced to Augustus, he never sought favors from him, and he is said to have declined an offer of the management of the private correspondence of Augustus. His works consist of four books of *Odes*; a book of *Epodes*, or short poems; two books of *Satires*, and two books of *Epistles*, one of which is often cited as a separate work,

under the title of the *Art of Poetry*. The lyrics of Horace are largely based on Greek models, but the exquisite beauty of his language is all his own. It is, however, in his satires and epistles that he shows the greatest power and originality, wit, gravity and gaiety, tender sentiment and melancholy. His writings have been often translated, and into many languages. In English, Pope and Swift have given free imitations of various parts of his writings.

Hore'hound, a plant of the mint family, with whitish, downy leaves and stem. The flowers are small and nearly white, possessing an aromatic smell and bitter flavor. The leaves also are fragrant and in various forms are used as a popular remedy for coughs and colds. Horehound is a native of Great Britain and Continental Europe, and black horehound is domesticated in the United States.

Horn, the name given to a large class of musical instruments, originally formed, as the name denotes, from the horn of an animal. The French horn, or simply *the horn*, consists of a metallic tube, about ten feet in length, very narrow at top, bent into rings and gradually widening toward the end whence the sound issues, called the *bell*. It is blown through a cup-shaped mouthpiece, of brass or silver, and the sounds are regulated by the player's lips, the pressure of his breath and by the insertion of the hand in the bell of the instrument. The French horn has been superseded by the valved horn, which has a greater variety in pitch and quality. Its compass is about three octaves. Music for the horn is always written in the key of C and an octave higher than it is played, but it can be played in almost any key, by adjusting the length of the tube.

Horn, a general term applied to all hard and pointed appendages of the head, such as those in deer, cattle, sheep and goats. As a term denoting a particular kind of substance, nothing should be called horn which is not derived from the epidermis, or outer layer of the skin, whether on the trunk, hoofs or head. Horn is a tough, flexible, partially transparent substance, most liberally developed in the horns of animals of the ox family, but also found in connection with the "shell" of the tortoise, the nails, claws, and hoofs of animals and the beaks of birds and turtles. Horn is softened very completely by heat, so as to become readily flexible and to adhere to other pieces similarly softened. In some species of animals the males only have horns, as, for instance, the stag. In cattle, both

male and female have horns. Horns differ widely in the case of different animals. Thus, the horns of deer consist of bone and fall off at regular intervals; those of the giraffe are independent bones, with a covering of hairy skin; those of oxen, sheep and antelopes consist of a bony core, covered by a horny sheath. The horns of the rhinoceros alone consist exclusively of horny matter. The horns of oxen, sheep, goats and antelopes are never shed, except in the case of the prong-horned antelope. The number never normally exceeds four, and in the case of deer the horns are branched.

The various kinds of horns are employed for many purposes. The principal ones used in the arts are those of the ox, buffalo, sheep and goat. Deer horns are almost exclusively employed for the handles of knives and of sticks and umbrellas. Those which furnish true horn can be softened by heat (usually in boiling water), and cut into sheets of various thickness. These sheets may be soldered or welded together at the edges, so as to form plates of large dimensions. These can be polished and dyed so as to imitate the much more expensive tortoise shell. The clippings of horn may be welded together in the same manner and made into snuff-boxes, powder-horns, handles of umbrellas, knives, forks and other small articles. As horn has the valuable property of taking on and retaining a sharp impression from a die, many highly ornamental articles may be turned out. Combs for the hair are made from the flattened sheets, and out of the solid parts of buffalo horns beautiful carvings are made.

HORN, PHILIPPE DE MONTMORENCY-NEVELE, Count of. See HOORNE, PHILIPPE DE MONTMORENCY-NEVELE, Count of.

Horn'beam, a small, bushy tree, common in Great Britain, often used in hedges, as it survives cutting and in age becomes very stiff. The wood is white, tough and hard and is used by carpenters and wheelwrights in making various articles, but it does not withstand the action of water or the weather well and should not be used in exterior construction. The inner bark yields a yellow dye. The American hornbeam is a small tree sparingly diffused over the whole United States, where it is called *leverwood*, *ironwood* and *blue beach*.

Horn'bill, a bird related to the kingfishers and toucans, living in the warm parts of Africa, southern Asia and the islands of the Pacific Ocean. Its enormous bill is its most striking characteristic. This formidable weapon is long,

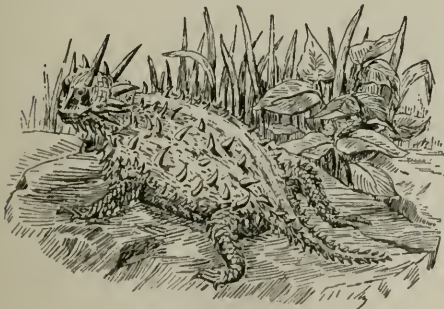
Hornblende

broad, curved and in some species has a large helmet-shaped or horn-like projection nearly as large as the bill itself. The bill of the rhinoceros hornbill is about a foot long, but in spite of its great size it is very light. The bird is stupid and clumsy, has a heavy, slow flight and feeds upon soft foods and fish and reptiles. It nests in hollow trees, and when the eggs are all laid, the female goes in upon the nest, the male closes with mud all but a narrow opening and carefully feeds the female, who sits in imprisonment upon the eggs until they are hatched.

Hornblende, *horn'blend*, or **Amphibole**, *am'fe bole*, one of the most abundant and widely diffused of minerals, remarkable on account of the various forms and compositions of its crystals and crystalline particles and because of its exceedingly diversified colors. These variations give rise to almost numberless varieties, many of which have obtained distinct names. Hornblende frequently occurs in distinct needle-shaped crystals, which are grouped in various ways. It enters largely into the composition and forms a constituent part of several of the trap rocks, and it is an important constituent of several species of metamorphic rocks, as gneiss and granite. In color, hornblende exhibits various shades of green, often inclining to brown, white and black, with every intermediate shade; it is nearly transparent in some varieties, in others it is opaque; its hardness is about the same as that of feldspar. Its chief constituents are silica, magnesia and alumina.

Horned Owl. See **OWL**.

Horned Toad, a name given to a genus of lizards, of toad-like appearance, found in



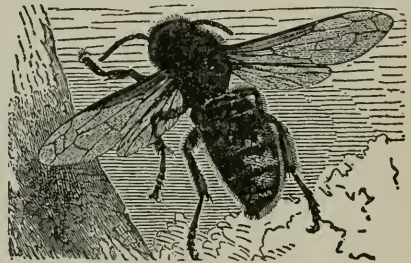
HORNED TOAD

America west of the Mississippi, where it lives in dry places and feeds upon flies and various insects. The scales covering the body bear sharp, horny spines; hence the name. There are nine different species.

Horse

Hor'nell, NEW YORK., a city in Steuben co., 91 mi. s. e. of Buffalo, on the Canisteo River and on the Erie and other railroads. It was settled in 1790 and was known as Upper Canisteo until 1820. A city charter was received in 1890. The place has a good high school, a free library, several city parks, Saint Ann's Academy, Saint James Mercy Hospital and a number of fine public and private buildings. The city is in a fertile agricultural and fruit region and has manufactories of lumber products, railroad supplies, agricultural implements, furniture, silks and various other articles. Population in 1905, 13,259.

Hor'net, an insect much larger and stronger than the ordinary wasp. It is voracious, feeding on fruit and honey and on other insects.



HORNET, ENLARGED

Hornets live in colonies and make their nests of a kind of paper work, placing them in hollow trees, in the crevices of walls and upon the limbs of trees. All species are able with their stings to inflict painful wounds, which are usually accompanied with considerable swelling.

Hor'oscope, a scheme, or figure, of the twelve houses, or twelve signs of the zodiac, in which is marked the disposition of the heavens at a given time and place. By this diagram, astrologers formerly told the fortunes of persons, according to the position of the stars at the time of their birth. The ascendant was that part of the heavens which was rising in the east at the moment; this was the first and most important house, or house of life, and contained the five degrees above the horizon and the twenty-five beneath it. See **ASTROLOGY**.

Horse, a domestic animal, closely related to the ass and the zebra. The horse is not a cud-chewing animal. It has a single, unparted hoof and a compact, graceful body, with arched neck and long mane. The horse is a native of the East and was introduced into America by Columbus and those who immediately followed. The herds of wild horses found by later colonists

sprang from those introduced by the early settlers.

Our modern horses can be classified under three groups, the small breeds, generally known as ponies; the heavy draft horses, and the more graceful thoroughbreds, used for carriage horses and racing. The ponies have descended from the wild horse of the mountainous regions of northern India. The heavy draft horses have been developed by careful breeding with the larger types of central and northern Europe, and the thoroughbreds are from the Arabian and Turkish horses.

In England and the United States, horse racing has been an enticing sport for many years, and much attention has been given to the development of racing animals, until now horses that can trot a mile inside of two minutes are found on race courses.

The horse is one of the most intelligent of animals and is gifted with keen senses. He can distinguish objects at night, and his large ears, movable in different directions, enable him to perceive sounds that man cannot hear. His sense of smell sometimes also warns him of the approach of dangerous animals and enables him to distinguish his master from other men. The horse takes more kindly to man than other animals and becomes more devotedly his friend. The Arab loves his horse next to his family, and the animal returns his affection. Horses often show love for children and form friendships with dogs and other domestic animals. They can usually be ruled by kindness, and no animal deserves better treatment or returns it with more certain gratitude.

Horse-chestnut, *ches'nut*, a handsome genus of trees or shrubs, with large, opposite, fan-shaped leaves and terminal panicles of showy white, yellow or red flowers. The seeds are large and brown and are highly polished, and the bitter meats have been used as food for animals. The wood is not valuable. Some

species are found in North America, but they are smaller than the true horse-chestnut and are less valuable for their wood. See BUCK-EYE.

Horse Latitudes, the sailor's name for the belts of tropical calm found near the tropic of Cancer and the tropic of Capricorn. These are not continuous belts of calm, but within these latitudes regions of calm appear, separated by spaces where there is a regular and constant breeze. They are but a few degrees wide and move slightly north and south with the movement of the sun. Within these regions the weather is clear, and fresh, light, variable winds follow the occasional calms. The horse latitudes are not dangerous, as are the doldrums, but are a hindrance to sailing vessels. These calms are so named because before the days of steamships many horses were exported from the United States in vessels whose route lay through the regions of tropical calms in the North Atlantic. If becalmed for any length of time some of the horses were thrown overboard, since the ship could not carry a sufficient supply of fodder for the prolonged voyage. See DOLDRUMS.

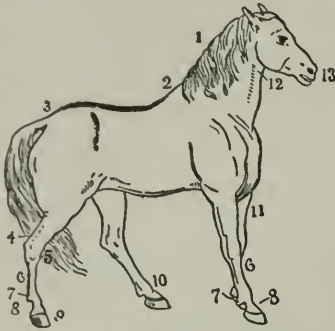
Horse'manship. See RIDING.

Horse Power, the unit of force employed in measuring the power of steam engines and other motors. A horse power is a force which will raise a weight of 33,000 pounds one foot in one minute. An engine of one hundred horse power could lift the same weight one hundred feet in one minute. This estimate is theoretical. In a practical estimate one-tenth is deducted for friction.

Horse Racing. See RACE.

Horse-radish, a plant belonging to the mustard family and inhabiting moist places in the temperate parts of America. The root is cylindrical, whitish in color, possesses a pungent taste and odor and when grated is used with vinegar as a relish to meats and other foods. It is also employed medicinally as a stimulant.

Horseshoe, a shoe for horses, consisting commonly of a narrow plate of iron, bent into a form somewhat resembling the letter U, so as to accommodate itself to the shape of the horse's foot. Horseshoes do not appear to have been known to the ancients. Xenophon, Vegetius and others mention various processes for hardening the hoofs so as to make them stronger, but say nothing of any protection like the horseshoe. Iron horseshoes are mentioned as being in use in Europe in the ninth century of our era.

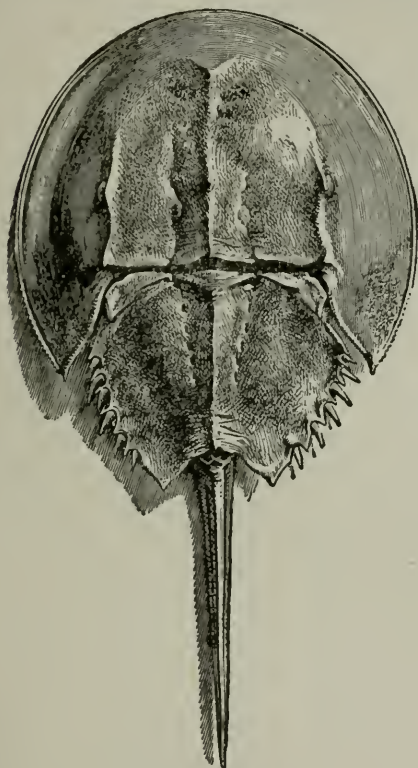


HORSE

1, Crest; 2, withers; 3, croup; 4, hamstring; 5, hock; 6, cannon; 7, fetlock; 8, pastern; 9, hoof; 10, coronet; 11, arm; 12, gullet; 13, muzzle.

They seem to have been introduced into England by the Normans. They were introduced into the United States by the early colonists and are now in use by all civilized nations.

Horseshoe Crab, a large crustacean which receives its name from the shape of its shell. It lives in deep waters and comes to the surface only during the spawning season, when it

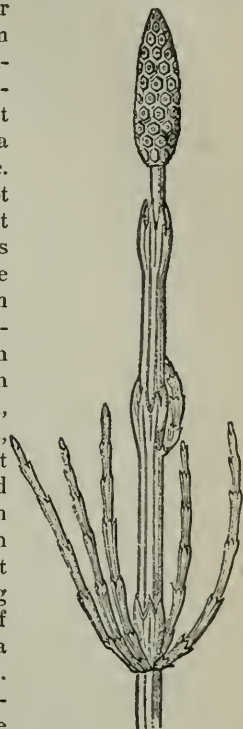


HORSESHOE CRAB

appears in great numbers. The *king crab*, found on the northeastern coast of the United States, where it reaches a length of nearly two feet, is also called horseshoe crab. It burrows in the sand and mud and lives on shellfish and worms. In burrowing, the head is thrust downward and the tail is used as a brace to push the body forward. The body of the horseshoe crab is composed of two parts, the horseshoe shell and a back region, which is prolonged into a long, spine-like tail.

Horsetail Rush or **Eq'uise'tum**, a peculiar plant, of which now there is only one genus remaining, though in the early history of the earth there were many kinds, some of which were enormous trees. The present plant is small and

slender, with roughly-ridged stem, and it may be recognized by the ease with which it is pulled apart at the joints, which are surrounded by circles of minute leaves. The stem is green in all species, except that the fertile plants of some are colorless. In one or two species the stem is straight and unbranched, while in others it branches so that the plant resembles a little evergreen tree. These rushes are not flowering plants, but the fertile form produces spores not unlike those of the fern, but held in cases that resemble miniature pine cones. Each spore is provided with two spiral bands which, while the spore is moist, are coiled tightly about its body, but when dried unroll to be again drawn up to the body when moisture is applied. It is an interesting thing to watch the action of these bands under a simple magnifying glass. The result of the opening and closing of the bands is to bring the



HORSETAIL RUSH

spores tightly together in masses. The horsetail rush is commonly known as the *scouring rush*.

Hors'ley, VICTOR ALEXANDER HADEN, Sir (1857-), an English surgeon, noted especially for his studies of nervous diseases and his discoveries of the functions of specific areas of the brain. Among his important works are a *Pathology of Epilepsy and Canine Chorea*, *Brain Surgery*, *Hydrophobia and its Treatment* and *Experiments upon the Functions of the Cerebral Cortex*.

Horticulture, the cultivation of fruits, vegetables and ornamental plants; a branch of agriculture. Horticulture is practiced for pleasure and for commercial purposes. Formerly the term meant the same as gardening, but in the United States it has outgrown that meaning. Horticulture was developed much later than agriculture and is usually most prosperous in the older countries. When practiced for commercial purposes, it leads to a number of different

industries. The raising of vegetables is generally known as truck farming. This line of horticulture is extensively carried on near large cities and in the South Atlantic states. It has become an important industry and now employs nearly two hundred fifty thousand persons and has an annual return of about eighty million dollars. The growing of flowers and ornamental shrubs for sale is another important branch of horticulture. Nurseries and conservatories, whenever practicable, are located near cities, as it is necessary that products be placed on the market without delay. The practice of horticulture requires a thorough knowledge of the properties of soils and of the habits of the plants grown and the conditions under which they thrive. It is estimated that there are over twenty-five thousand species and varieties of plants that engage the attention of horticulturists in the United States. See AGRICULTURE; GARDENING; LANDSCAPE GARDENING.

Hosea, *ho ze'ah*, the first in order among the minor prophets of the Old Testament, but probably the third in order of time. Nothing is known of his life, except that he was the son of Beeri and that his ministry belonged to the reigns of Uzziah, Jotham, Ahaz and Hezekiah, kings of Judah.

Hos'mer, HARRIET (1830-1908), an American sculptor, born at Watertown, Mass. She studied at Rome under John Gibson, and her best-known works are ideal heads of *Daphne* and *Medusa*, *Puck*, the *Sleeping Faun*, *Waking Faun*, *Beatrice Cenci* and *Zenobia in Chains*.

Hos'pital, any building appropriated to the use of any class of persons who are unable to supply their own wants. Hence, hospitals are of various kinds, according to the class of persons for whom they are intended. A large number of hospitals are medical; others are for the reception of the insane; others for the aged and infirm; others for the education of dependent children; others for the reception of the wounded in battle, and so on. The first establishments of this nature are believed to belong to the fourth century after Christ. Their primary object was to afford a shelter to strangers and travelers, and it was only occasionally that the sick and infirm were admitted. One of the earliest hospitals of which we have any satisfactory information was that established by the emperor Valens, at Caesarea, about the end of the fourth century, and conducted on a very large scale. During the crusades several military orders, like the Knights Hospitallers,

were created to care for the wounded and sick. The Arabs in Spain, at an early period of their occupation of that country, founded a magnificent hospital at Cordova, where physicians were trained, who did a great deal to advance the study of medicine. The Arabs have also the credit of having founded the first lunatic asylum in Europe, which was erected in the city of Granada.

The majority of hospitals everywhere are medical. These may be divided into general and special hospitals, the former class admitting cases of all kinds; the latter class admitting only patients suffering from some special trouble. Thus, there are hospitals for the treatment of cancer, consumption, smallpox and many other diseases. There are also hospitals for children and those for persons suffering from incurable diseases. Such institutions serve a double purpose, inasmuch as they not only afford the best medical advice and treatment to the poor, who would otherwise be unable to obtain them, but also supply the best means of giving instruction in medicine, surgery and nursing to students, who may thus watch nearly every variety of disease and observe how all are treated by the most skilled physicians and surgeons. For this reason a good infirmary, or medical hospital, is an indispensable adjunct to every school of medicine and surgery.

Hospitals for the sick and hurt are usually divided into wards, each containing a large or small number of beds. Medical and surgical wards are usually kept separate, and all contagious diseases are treated by themselves in distinct buildings. Each hospital has a matron, a house surgeon and an apothecary resident within its walls. The duties of the matron consist in regulating the night and day nurses, the washing and laundry department, the purchase of the necessary supplies of provisions, and in keeping a general superintendence over the kitchen and the food of the sick. The house surgeon takes care of all casualties and accidents in the absence of the principal surgeons. The apothecary takes care of the pharmacy and prepares all the medicines prescribed from time to time by the surgeons and physicians. There is a well-lighted, well-equipped room set apart for the performance of surgical operations, and there is a mortuary for the reception of corpses previous to interment. The nurses relieve one another day and night in a regular manner.

Objection has been made to the present plan of constructing large edifices for hospital purposes,

Hospital

because the benefit they confer is greatly diminished by the risk of contagion to which patients are exposed; and the cottage system of construction has been strongly advocated. This form of hospital consists of temporary, detached cottages which can be easily removed or replaced. Difficulties in connection with expense and administration of this system have made it impracticable. The pavilion system of construction is a compromise between the large blocks and the cottages, or huts. According to this system, the wards should be separated from the administrative part of the establishment and should be arranged in pavilions of one story, where practicable, but never of more than two. The pavilions should always surround the administrative blocks. This mode of construction is equally applicable to large and small establishments. The Royal Infirmary of Edinburgh, the Herbert Hospital of Woolwich and the New York Hospital are among the best examples of the pavilion style. Convalescent homes, where patients are reinvigorated by a short stay, after being cured in the infirmary, may be regarded as supplementary to medical hospitals. Hospitals under the control of the city are located in all large places, and others are established by counties and by states, and in recent years many of the smaller cities and towns are erecting hospitals, which are attended by local physicians. In these the patients are often cared for by Sisters of Mercy or members of some similar charitable organization. Hospitals or asylums for drunkards, for habitual users of opium or morphine and for other vicious classes have been established in many parts of the United States.

Military and naval hospitals, or establishments for the reception and care of sick and wounded soldiers and seamen, have been in existence in all civilized countries for a long period. Military hospitals are either permanent or temporary establishments. Temporary hospitals are any available buildings in the immediate vicinity of the scene of operations. Hospital ships are fitted out to accompany all expeditions on sea. They serve either as stationary hospitals or, if the sick accumulate, they can sail home or to a near-by port. Such a ship is regarded by civilized nations as not subject to attack, provided it carries no arms and makes no attempt to give aid except to sick and wounded. The United States hospital ships are painted white, with a broad green band the length of each side. They fly the red cross flag, as well as the national ensign.

Hotel

Hostage, a person or thing given to another as surety of the performance of a certain contract. It is common in time of war for a town that has surrendered to give the victors the custody of several officers, as pledge that the conditions of surrender will be lived up to. Sometimes, also, the victors place hostages in the hands of the vanquished, to guarantee the fulfillment of their promises. When the conditions have been fulfilled, the hostages are exchanged.

Hotchkiss, BENJAMIN BERKELY (1826-1885), an American inventor, born in Watertown, Conn. He designed a field gun on a new pattern, and in 1860 he submitted to the United States government a system of rifle projectiles, which was largely used during the Civil War. In 1867 he introduced his revolving cannon to the European governments, and after that he devised a magazine rifle.

Hotel, a house open for the accommodation of the public, with board and lodging. It is a comparatively modern development of the old inn, or road house, which is still common in Europe, where provision was made for occasional guests. Hotels are of three kinds—those managed upon the so-called *European* basis, according to which a set price is paid for a room and its accompanying accommodations, while the guest pays separately for the food which he orders; those on the *American* plan, according to which the guest pays a certain amount each day for both room and meals, and those which combine in their management these two plans.

A modern hotel contains a large number and variety of rooms and appointments. Of course, by far the largest space is given to the private bedrooms occupied by guests. One of the most conspicuous features is the so-called office, or lobby, which, besides containing the office of the hotel, is usually the meeting place for persons both within and without the building, and which contains numerous news, cigar and confectionery stands, telephone booths and telegraph offices. Adjoining it are usually reading, writing and smoking rooms, while near at hand, either on the same floor or upon the floor above, are the parlor and reception rooms, both public and private. Most hotels have several dining rooms, one large public dining room, a smaller café, or breakfast room, and private dining rooms, according to the size and rank of the hotel. A majority of American hotels now have one or more bars, barber shops and public baths. All floors are connected by elevators

and usually by broad decorative stairways. Beneath the office, or in some other convenient place, are baggage and store rooms, while above, besides the guest rooms, there may be a ball room, a concert hall, a theater, a roof garden, or all of these.

The safety of the guests is carefully attended to, both in the construction and sanitation of the building and in the provision of numerous means of escape in case of fire or accident. For the convenience and comfort of the guests many accommodations are provided, such as bells, by which attendants are summoned to the various rooms in the building, and, more recently, private telephone exchanges, with connection, not only with all parts of the building, but with systems outside of the hotel.

The management of a modern hotel requires the services of a large number of persons, usually fully one-half as many as the number of guests for which the hotel has accommodations. The chief executive is the manager, under whom, next in importance, is the steward, who has entire charge of the purchases and supplies. The kitchen is in charge of the *chef*, who arranges and provides the meals, reporting his needs to the steward. In the dining room the chief person is the head waiter.

In the law, hotels are treated in much the same light as common carriers; that is, they are bound to receive all proper persons who apply to them for accommodations; they are liable for the safety of goods left within their premises, unless the damage done is by act of God or the public enemy, and, on the other hand, they have a lien on the goods of guests to assure the payment of their bills. See *CARRIER, COMMON*.

Hot Springs, ARK., the county-seat of Garland co., 50 mi. s. w. of Little Rock, on the Little Rock & Hot Springs and the Chicago, Rock Island & Pacific railroads. The city is in a beautiful location and has a mild climate. On account of the many flowing springs of hot water, it has become one of the greatest health resorts in the world. The water is prescribed for bathing and drinking and has strong curative properties. In 1832 the national government set off 2529 acres of land, with the thermal springs in the center, as a government reservation. There are many large hotels here, among which are the Eastman, the Arlington, the Park and the Majestic. Considerable stone is quarried in the neighboring mountains, and the city has an extensive cotton market. Hot

Springs was settled about 1804 and was chartered as a city in 1879. Population in 1900, 9973.

Hot/tentots, a peculiar African race, supposed by some authorities to be the aboriginal occupants of the south end of that continent, south of the Orange River and west of the Kei. When young they are of remarkable symmetry; but their faces are ugly, and this ugliness increases with age. The complexion is a pale olive, the cheek bones project, the chin is narrow and pointed and the face consequently is triangular. The lips are thick, the nose is flat, the nostrils are wide, the hair is woolly and the beard is scanty (See *RACES OF MEN, color plate, Fig. 3*). When the Dutch first settled at the Cape of Good Hope, in the middle of the seventeenth century, the Hottentots were a numerous nation, of pastoral and partially nomadic habits, and occupied a territory of 100,000 square miles. At the present day this race is nearly extinct, having been entirely hunted out and dispersed by the Boers.

Houdon, *oo doN'*, JEAN ANTOINE (1741-1828), a noted French sculptor, born at Versailles. Early in life he showed a genius for sculpture and studied conscientiously the works of the great masters. His study in Rome, which lasted ten years, was very important as being the formative period of his life. After his return to Paris he was admitted to the Academy and was at once recognized as one of the greatest of French sculptors. In 1785 he visited America with Benjamin Franklin, and during his stay he executed a bust of George Washington. Houdon's greatest work was the series of more than two hundred busts of eminent men, the best of which were of Franklin, Gluck, Molière, Rousseau, Mirabeau and d'Alembert. Among his important statues are those of Cicero and Voltaire. Other works especially worthy of mention are his familiar *Ecorché* and the nude figure of *Diana the Huntress*, made for Catharine of Russia.

Hound, a name given generally to hunting dogs, but restricted by scientific writers to such as hunt by scent. Among the varieties are the bloodhound, staghound, foxhound, harrier and beagle. Hounds are distinguished not only by their keenness of scent, but by gentleness and intelligence. Of the rough-haired and smooth-haired varieties, the former manifest the greater affection for man.

Hourglass, *owr'glas*, an instrument for measuring time, consisting usually of two hollow

bulbs, placed one above the other, with a narrow neck of communication, through which a certain quantity of dry sand, water or mercury is allowed to run from the upper to the lower bulb, the quantity of sand being adjusted so as to occupy an hour in passing from one bulb to the other. When all the sand has run into the lower bulb, the glass is turned. The hourglass was commonly used in churches during the sixteenth and seventeenth centuries to regulate the length of the sermon. Small glasses of the same pattern, called *egg-glasses*, are sometimes used for determining the time required to boil eggs. The hourglass is now considered only as a curiosity. See **CLOCK**.

Housatonic, *hoo'sa ton'ik*, a river rising in the Berkshire Hills, Massachusetts. It flows south through Connecticut and empties into Long Island Sound four miles east of Bridgeport. It is 150 miles long. The surrounding region affords very beautiful scenery.

House'boat, usually a flat-bottomed raft, upon which are built several rooms. It is becoming common for families or parties of friends to spend the summer months in such boats. This recreation has gained special favor in England, where the Thames River, during the summer, is crowded with houseboats. In America, the Mississippi River, the Pacific coast, the Saint Lawrence River and many of the larger lakes of New England and New York are favorite places for the enjoyment of houseboating. Houseboats are made in several different styles: those which are intended simply to float; those which are moved by poles or oars; those which carry sails, and those which are propelled by engines.

House'leek or **Live-forever**, a genus of plants characterized by the fact that the petals equal in number the sepals, or divisions of the calyx, and are inserted at the base of the calyx. The leaves are usually arranged in the form of compact rosettes. The best-known species, the common houseleek, or *cyphel*, grows wild in the Alps upon rocky soil, but it has been naturalized in most parts of Europe. Upright stems about six inches in height bear branches of red, star-shaped flowers. The leaves, if bruised or cut, afford immediate relief to burns, stings or other inflammation.

House of Commons. See **PARLIAMENT**.

House of Correction. See **PRISON**.

House of Lords. See **PARLIAMENT**.

House of Representatives. See **CONGRESS OF THE UNITED STATES**.

House Snake. See **MILK SNAKE**.

Houston, *hu'ston*, **TEX.**, sometimes called the "Magnolia City," the county-seat of Harris co., 50 mi. n. w. of Galveston, on Buffalo Bayou and on the Missouri, Kansas & Texas, the Southern Pacific, the Gulf, Colorado & Santa Fé, the International & Great Northern, the Houston & Texas Central and other railroads. It is the seat of the Rice Polytechnical Institute, and the other prominent buildings include the Houston Lyceum and the Carnegie library, high school, Federal building, cotton exchange and several churches. The city is an important railroad center, and the improvements in the Bayou now being made by the Federal government will allow the admission of large ocean vessels. It is one of the largest cotton markets in the world and has, also, an important trade in lumber, fruit, sugar, rice and hardware. The place was settled in 1836 and was named the next year in honor of General Sam Houston. Population in 1900, 44,633.

Houston, **SAM** (1793-1863), an American soldier and political leader, born near Lexington, Va. After his father's death, his family emigrated to Tennessee, and the lad later went to live among the Cherokee Indians, where he was adopted by Chief Oolooteka as his own son. In 1811 he returned to his family and two years later enlisted in the regular army. He served under General Jackson and in 1817 aided in the negotiations with the Cherokees. On his return to Nashville, he studied law and soon opened an office in Lebanon. He served in Congress from 1823 to 1827 and was then elected governor. After three months he resigned the governorship and returned to his old friends, the Cherokees. Their cause was later represented by him in Washington, where he again drew upon himself national attention.

In 1832 he went to Texas and soon became the leader of the American colonists. He was a member of the convention in April, 1833, which attempted to form a state constitution. When the trouble with the Mexicans had led to an armed conflict, Houston was made the commander in chief of the Texan forces. With a small band of undisciplined troops he conducted the military movements which led to the defeat of Santa Anna in the famous Battle of San Jacinto, April 21-22, 1836. This brought about the independence of Texas, and in September Houston was elected president. He served three terms and was the chief agent in bringing about the admission of Texas to the Union in 1845.

He sat in the United States Senate for twelve years and in 1859 was elected governor of Texas. At the outbreak of the Civil War, he retired to Huntsville, where he died two years later.

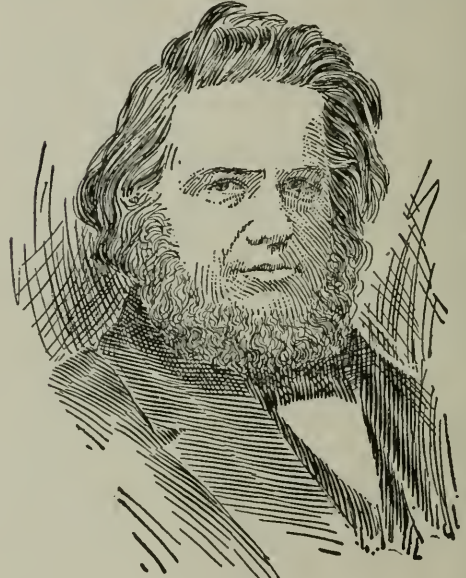
Hovey, *hur'y*, RICHARD (1864-1900), an American poet, born at Normal, Ill., and educated at Dartmouth. He studied for the ministry and was for a time an assistant in a New York Catholic church, but afterwards devoted himself to literary pursuits and was journalist, dramatist, poet, lecturer and actor. He spent several years in Europe and had shown promise of very high attainments, when he suddenly died. His *Launcelot and Guenevere*, a series of dramas, has remarkably musical lines and shows great imaginative power. Some of his shorter poems also display the same characteristics.

Howard, JOHN (1726-1790), an English philanthropist. In 1756 he undertook a voyage to Lisbon, to help the survivors of the recent earthquake, but the vessel in which he embarked was captured and he was consigned to a French prison. The hardships he suffered and witnessed directed his attention to the subject of prison reform, and he resolved to devote his time to the investigation of the means of correcting the existing abuses in the management of prisons. With this view he visited most of the English county jails and houses of correction, and in March, 1774, he laid the result of his inquiries before the House of Commons. He also visited many of the Continental prisons, as well as those of Scotland and Ireland. Many evils were remedied through his influence.

Howard, OLIVER OTIS (1830-1909), an American soldier, born in Leeds, Maine, educated at Bowdoin College and at West Point. He served in the Seminole War of 1857 and later was instructor at West Point. He enlisted in the Civil War as colonel of a volunteer Maine regiment and was promoted to be brigadier general of volunteers. In the Peninsula Campaign he distinguished himself, receiving a wound at Fair Oaks, which necessitated the amputation of his right arm. He was conspicuous in the battles of Antietam, Fredericksburg, Chancellorsville and Gettysburg. He then was sent to the west, being present at the Battles of Chattanooga, and commanded the right wing of Sherman's army in his marches to Atlanta and to the sea. He was appointed brigadier general in the regular army and brevetted major general in March, 1865. For several years after the war he was at the head of the Freedmen's Bureau and performed notable

service in promoting the education of the negroes. He participated in the indian campaign of 1877 and 1878, was for a time superintendent of West Point Military Academy, and retired from the service in November, 1894. The following year he founded the Lincoln Memorial University at Cumberland Gap, Tenn.

Howe, ELIAS (1819-1867), inventor of the sewing machine, was born at Spencer, Mass. He received a common school education and for several years was employed in a cotton-machinery manufacturing establishment at Lowell, Mass. While working in a machine



ELIAS HOWE

shop in Boston he conceived the idea which resulted in the invention of the sewing machine. He perfected the machine in 1845 and patented it the next year. He was not successful in introducing it in America and so went to Europe, but there he received little encouragement. On his return from Europe he found manufacturers profiting by his invention. He prosecuted those who had infringed upon his rights, and in 1854 his claim to priority was legally established. The principal manufacturers agreed to pay him royalties on all the machines used. After that his income was princely, and his long patience had its just reward. Howe enlisted as a common soldier during the Civil War, and on one occasion, when the pay of the regiment was delayed, he advanced the money to pay off the men. He had conferred upon him the cross of the Legion

of Honor and was awarded many medals. The extensive use of the sewing machine attests its value. The shoemaking trade has been entirely revolutionized since its invention. See SEWING MACHINE.

Howe, JULIA WARD (1819–), an American author, born in New York City. At an early age Miss Ward wrote plays and poems. She was married to Dr. Samuel G. Howe, philanthropist, in 1843, and she afterward continued her studies, writing philosophical essays. In 1861 she composed the popular *Battle Hymn of the Republic*. She favored the woman suffrage movement and was in 1872 made president of the New England Women's Club. Mrs. Howe later published several volumes of poems, various sociological writings, a *Life of Margaret Fuller* and her own *Reminiscences*.

Howe, RICHARD, Earl (1725–1799), a British admiral. He took an active part in the Seven Year's War and in the American Revolution, commanding a fleet on the American coast and fighting several engagements with the French fleet under D'Estaing. In 1782 he distinguished himself in an expedition for the relief of Gibraltar, in which he offered battle to the combined fleets of France and Spain, which declined to accept the challenge. He became first lord of the admiralty in 1783 and was made an earl in 1788. He again saw brilliant service in the war with France in 1793, achieving the victory known as the "Glorious First of June."

Howe, TIMOTHY OTIS (1816–1883), an American lawyer and politician, born in Liverpool, Maine. He was admitted to the bar and was elected to the legislature in Maine, but in 1840 removed to Green Bay, Wis. There he was elected judge of the circuit and later of the supreme court of the state, and from 1861 to 1879 he represented Wisconsin in the United States Senate. He was offered an appointment to the United States Supreme Court to succeed Salmon P. Chase, but declined, and in 1881 he accepted a position as postmaster-general in President Arthur's cabinet.

Howe, WILLIAM, Sir (1729–1814), a British soldier, brother of Richard, Earl Howe. He served in America during the last French and Indian War, but returned to England and was elected to Parliament. At the opening of the American Revolution he condemned the British government's policy, but accepted a command in the British army in America, fought at Bunker Hill, was made lieutenant general and succeeded Gage as commander in chief. After two suc-

cessful campaigns, which, however, did not accomplish what he had expected, he resigned in 1788 and was succeeded by Clinton. His inactivity at Philadelphia in the preceding winter led to an investigation, but he was not censured.

Howells, WILLIAM DEAN (1837–), an American author, born in Martin's Ferry, Ohio, of Welsh-Quaker ancestry. He learned the printer's trade with his father and then went to Columbus, where, after serving for some time as a compositor, he became assistant editor of the *Ohio State Journal*. In 1861 he was appointed United States consul to Venice, and as a result of his four years' travels in Italy, he published *Venetian Life* and *Italian Journeys*. On returning to America he wrote for the *Nation* and the *Tribune*, and in 1871 he became editor of the *Atlantic Monthly*. After a residence of several years in England and Italy, he edited for a short time the *Cosmopolitan* and afterward became associated with the editorial department of *Harper's Magazine*. In this editorial work he constantly championed the realistic novel and opposed the romantic school. Although he has written many farces, among them *The Elevator*, *The Sleeping Car*, *The Mouse Trap* and *The Register*, many essays on literary topics and some poetry, it is as a novelist that Howells is best known. His more important novels include *A Modern Instance*, *The Rise of Silas Lapham*, *A Foregone Conclusion*, *A Hazard of New Fortunes*, *The World of Chance*, *Story of a Play*, *Ragged Lady*, *The Kentons* and *Letters Home*. Howells's characters and situations are such as may be encountered at any time in real life, and his style is admirably clear and easy.

Howitt, WILLIAM (1792–1879) and **MARY** (1799–1888), English authors who produced several works in conjunction. They were married in 1821, and two years later they published *The Forest Minstrel*, a book of poems. This was followed by *The Desolation of Eyam*, *Literature and Romances of Northern Europe* and *Ruined Abbeys and Castles of Great Britain*. In 1840 they visited Germany, where William Howitt gathered the material for his *Student Life in Germany* and *Rural and Domestic Life in Germany* and his wife made translations of the works of Frederika Bremer and of Hans Christian Andersen. Important among William's separately produced works, other than those named, are the *Book of the Seasons*, *Rural Life in England* and a *History of England*. Chief among Mary's separately produced works, not already mentioned, are *Tales in Prose for Young*

People, Tales in Verse for Young People and Sketches of Natural History.

Howitzer, a short piece of ordnance, usually having a chamber for the powder, narrower than the bore, specially designed for the horizontal firing of shells with small charges, combining in some degree the accuracy of the cannon with the caliber of the mortar, but much lighter than any other gun of the same capacity. The rifled gun, throwing a shell of the same capacity from a smaller bore, and with much greater power, has superseded the howitzer for general purposes.

Howlers, a genus of South American monkeys, characterized by a remarkably loud voice, which is due to the presence of a large chamber within the hyoid bone and to the enlargement of the larynx. In the tropical forests of America their hideous howls may be heard during the night more than a mile away. They can suspend themselves by winding their tails around the branches of trees and are large and heavy of body, with a high pyramidal head, flattened on the top.

Hubbard, ELBERT (1850-), an American writer and maker of fine books, born at Bloomington, Ill. He founded and became the proprietor of the famous Roycroft Shop in East Aurora, N. Y., which is devoted to the making of *de luxe* editions of classics. He also originated the periodical called *The Philistine*, a magazine of philosophy and criticism, notable for its epigrammatic style, its independence of conventionalities and its frank tone, marred at times by vulgarity. He has also written *Little Journeys*, a series of studies of the lives and works of great figures in the world of art, religion, literature, oratory and statecraft; *A Message to Garcia*, and many other essays.

Huckleberry or **Whortleberry**, the fruit of a common shrub which grows wild in the United States. The common whortleberry is a hardy plant which lives in forests, heaths and on mountains. In some of the pine forests of Scotland it grows to a height of three feet. The berries are gathered in large quantities and sold in the markets during the season. There are many varieties, the blueberry being considered the best. Huckleberries have a pleasant, sweet taste and are used for sauce, jellies and pies and are eaten raw. The small red berries, edible only after being cooked, are popularly known as cowberries.

Huddersfield, a manufacturing town in the West Riding of Yorkshire, England, 16 mi. s. w. of Leeds. Among the chief buildings are

the townhall and the market hall. The town has also a college, affiliated with London University, and other educational institutions. The city is one of the chief centers for the woolen manufacturing industry. Coal mining and stone quarrying are also important industries. This town was the first to adopt an eight-hour workday. Its importance dates from the eighteenth century, when the woolen manufacture was established. Population in 1901, about 95,000.

Hudson, MASS., a town in Middlesex co., 17 mi. n. w. of Worcester, on the Boston & Maine railroad. It has manufactories of rubber goods, clothing, leather and other products. The government is administered by officials chosen at town meetings. Population in 1905, 6217.

Hudson, N. Y., county-seat of Columbia co., 28 mi. s. of Albany on the Hudson River and on the New York Central and other railroads. The city is beautifully situated on the slope of Prospect Hill. Prominent buildings are the State House of Refuge for Women, the state armory, the State Volunteer Firemen's Home and the Hudson Orphanage Asylum. The various industries include foundries, machine shops, creameries, lumber mills and manufactures of car-wheels, stoves and other articles. The place was settled in 1783, under the name of Claverack Landing. It was made a port of entry in 1790, and for many years it had an extensive foreign trade, which was almost completely destroyed during the War of 1812. Population in 1905, 10,290.

Hudson, HENRY (?-1611), an English navigator and explorer. He sailed from London in the year 1607, with only ten men and a boy, to discover the northeast passage, and proceeded beyond the 80th degree of latitude. Two later voyages for the same purpose were also fruitless, and in 1609, in the employ of the Dutch East India Company, he sailed for North America and discovered the Hudson River, which he ascended to about the site of Albany. In 1610 he sailed in an English ship named the *Discovery*, and, in an effort to find a northwest passage to Asia, discovered Hudson Strait and Hudson Bay, where he wintered; but his crew, after suffering many hardships, mutinied and set him adrift in a boat, along with his son John and seven of the most loyal of the crew, none of whom was ever heard from again.

Hudson Bay or **Hudson's Bay**, an extensive bay, or nearly enclosed gulf, connected with both the Atlantic and the Arctic oceans. It extends from about 51° to 64° n. latitude, or nearly 900

miles. Inclusive of a southern extension, known as James Bay, it has an area of more than 400,000 square miles, and its average depth is 70 fathoms, or about 420 feet. Hudson Bay is navigable for four and a half months in summer (from the middle of June to the end of October), being obstructed by drift ice during the rest of the year. The shores on the east are high and bold; but those on the west, especially toward the south, are low and level, and much of the land here is favorable for stock and dairy farming. The white whale is found in Hudson Bay, and there is a considerable summer fishery. It has long been the center of a prosperous fur trade.

Hudson River, an important river which rises in the northern part of the State of New York, in the Adirondack Mountains, and flows almost directly south, emptying into the Atlantic Ocean through New York Bay. Its whole course is over 300 miles, and it is navigable to Troy, 150 miles from its mouth, and for the largest vessels to Albany, 6 miles farther south. Tide-water extends to Albany, making the lower half of the river more properly an estuary. At Glens Falls the Hudson has a fall of 50 feet. Great commercial power is now developed here by means of a dam. Because of its beautiful scenery, especially along the lower half, where its banks are high and rocky, the river is often called the "Rhine of America." The Palisades, near its mouth, are considered one of the most beautiful natural formations on the continent. Many thriving towns are situated along the river's course, including Albany, Troy, Poughkeepsie, West Point, Peekskill and Yonkers.

Hudson's Bay Company, an English trading company, chartered in 1670. It had long a monopoly of the trade throughout the whole territory of North America whose streams flow into Hudson Bay, and at one time as far westward as the Pacific, with rights of governing and making war. In 1869 its authority was transferred by act of Parliament to the Crown, and its territories were incorporated in the Dominion of Canada. Its trade in furs is still very large. See FUR AND FUR TRADE.

Huè, *hoo ay'*, the capital city of the Kingdom of Annam, on the river Hué, in French Indo-China. It was fortified in the present century in European style by French officers in the service of the king of Cochin-China. The city has a considerable trade and is indirectly ruled by a French resident and his staff. Population, about 100,000.

Hugh Ca'pet (939-996), king of France from 987 to 996. He succeeded his father as count of Paris in 956, and in this position he was practically ruler of France, though he did not possess the actual title. When Louis V, the last king of the Carolingian line, died without heirs, Hugh Capet was chosen his successor and thus founded the Capetian dynasty (See CAPETIAN DYNASTY). His reign was occupied with a contest with the feudal lords in the surrounding territory.

Hughes, Charles Evans (1862-), an American lawyer and statesman, born at Glens Falls, N. Y. He was educated at Colgate University, Brown University and the Columbia Law School. In 1891 he was elected professor of law in Cornell University; later he was lecturer at the New York Law School. He first came prominently before the public in 1904 in his investigation, as counsel to the Legislature Committee of New York, of gas, electric light and power companies, and later of the New York Life Insurance Company. In 1906 and again in 1908 he was elected governor of New York.

Hughes, huze, JAMES LAUGHLIN (1846-), a Canadian educator, graduate of the Toronto Normal School. At the age of twenty, he became assistant in the model school connected with the normal school, and three years later he was made principal. In 1874 he was elected inspector of public schools in Toronto, a position corresponding to that of superintendent of city schools in the United States. Mr. Hughes is well known in the United States through his lectures before educational assemblies and Chautauquas, also through his writings. In 1893 he was chairman of the elementary department in the World's Congress of Education. His best-known works are *Mistakes in Teaching*, *How to Secure and Retain Attention*, *Froebel's Educational Laws for All Teachers* and *Dickens as an Educator*.

Hughes, THOMAS (1823-1895), an English lawyer, author and philanthropist, born at Uffington, Berkshire. He is widely known for his novel, *Tom Brown's School Days*, a picture of school life at Rugby, published in 1856. It was followed by *Tom Brown at Oxford*, *The Scouring of the White Horse*, *Alfred the Great* and other writings. Hughes devoted much of his time to the work of the social elevation of the working class, encouraging in particular the coöperative system.

Hugli, *hoog'ly*, or **Hoogly**, a river of Hindustan, in Bengal, formed by the junction of the Bhagirathi and the Jalangi at Nadija, about

55 mi. above Calcutta, and constituting the principal channel of the Ganges delta. It is 15 miles wide at its mouth, but much encumbered by shoals. Ships drawing 22 feet ascend as far as Calcutta. Its total course is about 160 miles.

Hu'go, VICTOR MARIE (1802-1885), a great French poet, novelist, dramatist and politician. At the age of twelve he was already writing



VICTOR HUGO

verses; in 1822 he published the first volume of his *Odes and Ballads*, and in 1823 his first novel, *Hans of Iceland*, appeared, followed in 1825 by *Bug Jargal*. In 1826 a second volume of his *Odes and Ballads* appeared, and in these Hugo's anti-classical tendencies in style and treatment of subject became visible. The appearance of his drama, *Cromwell*, marked Hugo at once as the leader of the romantic school. *Hernani*, first presented in 1830, was a further attempt to overthrow the classic drama in France, and the result of its presentation was a great conflict between Romanticists and Classicists (See DRAMA). Other plays followed, *Marion Delorme*, *The King Amuses Himself*, *Lucretia Borgia* and *Ruy Blas*; but Hugo was not greatly successful as a dramatist, and after 1843 he turned his attention to other work. During these years in which he was chiefly occupied with dramatic composition, he had also published a novel, *Notre*

Dame de Paris, and several volumes of poetry, among them, *Autumn Leaves* and *Twilight Songs*. The poetry of this period has a melody and grace perhaps superior to any that he afterward wrote, but it lacks that deep and original sense of life which is characteristic of his later poems.

In 1841, after having been twice rejected, Hugo was elected a member of the French Academy, and in 1845 he was made a peer of France by Louis Philippe. The revolution of 1848 drew Hugo into the thick of the political struggle. At first he favored Louis Napoleon, but afterward, whether from suspicion of Napoleon's designs or from other reasons, he became one of the chiefs of the democratic party. After Napoleon's seizure of power, in 1851, Hugo was one of those who kept up the struggle against him to the last. Then, while in exile in Brussels, he produced the bitterly satiric *Napoleon the Little* and *The Châtiments*, attacks on the Second Empire. Hugo went from Brussels to Jersey, was expelled along with the other French exiles in 1855 by the English government and finally settled in Guernsey, where he remained until 1870. During these years in the Channel Islands he brought out *Les Misérables*, which appeared in ten languages on the same day; *The Toilers of the Sea*, and *The Man Who Laughs*, besides the collection of poems known as *Contemplations*. After his return to France he was made a member of the National Assembly, but soon resigned and went to Brussels, where, on account of the communistic character of his writings, he was not allowed to remain. When he was past seventy he published his *Ninety-three*, one of the strongest of his novels, and several collections of poems.

Huguenots, *hu'ge nots*, a term of unknown origin, applied by the Roman Catholics to the Protestants of France during the religious struggles of the sixteenth and seventeenth centuries. Under Henry II, 1547-59, the Protestant party grew strong, and under Francis II it became a political force headed by the Bourbon family, especially the king of Navarre and the prince of Condé. At the head of the Catholic party stood the Guises, and through their influence with the weak young king, a fanatical persecution of the Huguenots commenced. The result was that a Huguenot conspiracy, headed by Prince Louis of Condé, was formed, for the purpose of compelling the king to dismiss the Guises and accept the prince

of Condé as regent of the realm. But the plot was betrayed, and many of the Huguenots were executed or imprisoned. In 1560 Francis died, and during the minority of the next king, Charles IX, it was the policy of the queen mother, Catharine de' Medici, to encourage the Protestants in the free exercise of their religion, in order to curb the Guises. But in 1562 an attack on a Protestant meeting made by the followers of the duke of Guise commenced a series of religious wars which desolated France almost to the end of the century. Catharine, however, beginning to fear that Protestantism might become a permanent power in the country, suddenly made an alliance with the Guises and between them they planned and carried out the massacre of Saint Bartholomew (Aug. 26, 1572). The Protestants fled to their fortified towns and carried on a war with varying success. On the death of Charles IX, Henry III, a feeble sovereign, found himself compelled to unite with the king of Navarre, head of the House of Bourbon and heir-apparent of the French crown, against the ambitious Guises, who openly aimed at the throne, and had excited the people against him to such a degree that he was on the point of losing the crown. After the assassination of Henry III, the king of Navarre was obliged to maintain a severe struggle for the vacant throne; and not until he had, by the advice of Sully, embraced the Catholic religion (1593), did he enjoy quiet possession of the kingdom as Henry IV. Five years afterward he secured to the Huguenots their civil rights by the Edict of Nantes, which confirmed to them the free exercise of their religion and gave them equal claims with the Catholics to all offices and dignities. They were also left in possession of the fortresses which had been ceded to them for their security. This edict afforded them the means of forming a kind of republic within the kingdom, which Richelieu, who regarded it as a serious obstacle to the growth of the royal power, resolved to crush. War was waged from 1624 to 1629, when Rochelle, after an obstinate defense, fell before the royal troops; the Huguenots had to surrender all their strongholds, although they were still allowed freedom of conscience under the ministries of Richelieu and Mazarin. But when Louis XIV and Madame de Maintenon set the fashion of devoutness, a new persecution of the Protestants commenced. They were deprived of their civil rights, and bodies of dragoons were sent into the southern provinces to compel

the Protestant inhabitants to abjure their faith. The Edict of Nantes was revoked in 1685, and by this act more than 500,000 Protestant subjects were driven out to carry their industry, wealth and skill to other countries. In the reign of Louis XV a new edict was issued, repressing Protestantism, but so many voices were raised in favor of toleration that it had to be revoked. The Revolution first put the Protestants on an equality with their Catholic neighbors.

Hull, the capital of Wright County, province of Quebec, Can., on the Ottawa River, opposite Ottawa, Ont. The surrounding country contains both agricultural and mineral resources, and is traversed by the Canadian Pacific and the Pontiac Pacific railroads and by numerous electric lines. The principal manufacturing establishments are iron foundries, paper and pulp mills, pork-packing houses and lumber mills. The town was first settled in 1800 and became a city in 1870. It was almost destroyed by fire in 1900, but has since been rebuilt. Population in 1901, 13,988.

Hull or **Kingston-upon-Hull**, a river port of England, a county-borough, situated in the East Riding of York, at the influx of the Hull into the estuary of the Humber. The city's situation is on an unpicturesque plain, though the new portion of the city itself is well arranged and presents an attractive appearance. Among the important buildings are Trinity Church, built in 1412, the townhall, the market hall and the corn exchange. Hull is the seat of several educational institutions, none of which is of especial importance. The industries of the town are varied, comprising flax and cotton mills, shipbuilding yards, rope and sail works, iron foundries, machine-making, seed-crushing, color-making, oil-boiling and many other and allied industries; but its importance arises chiefly from its shipping commerce, Hull being the third port in importance in the kingdom. The docks are among the largest in the world. The city owns the markets, the tramways, as the street car lines are called, the lighting plant, the water supply, libraries, baths, a sanitarium, a crematorium, cemeteries and a sewage disposal plant. Hull is an ancient town and was of some importance long before it received its charter from Edward I in 1298. It played a conspicuous part during the Civil War, being held by the Parliamentary forces and twice besieged without success. Population in 1901, 240,600.

Hull, ISAAC (1773-1843), an American naval officer, born at Derby, Conn. In 1798 he became lieutenant in the United States navy, and he was steadily advanced in rank. When the War of 1812 broke out, he was commanding the *Constitution*. In his attempt to sail from Annapolis to New York, he escaped, by skilful seamanship, the close pursuit of five British vessels, and a month later he captured the British frigate *Guerriere* off Newfoundland. This victory, the first won by the Americans during the war, made Hull a popular hero.

Hull, WILLIAM (1753-1825), an American soldier, born in Derby, Conn., educated at Yale and admitted to the bar in 1775. He served in the American army during the Revolution, taking part in the battles of Trenton, Princeton, Saratoga, Monmouth and Stony Point, and attaining the rank of lieutenant colonel. He was elected to the state senate after the war, and in 1805 he became governor of the Territory of Michigan. At the outbreak of the War of 1812, he was made brigadier general and commanded the northwest. He immediately took the aggressive, but displayed mediocre military ability, and finally in August, 1812, he surrendered Detroit, after a brief resistance. He was court-martialed in March, 1814, and was sentenced to be shot, but President Madison remitted the penalty. It is now believed that the blame for the result of his campaign in the West lies fully as much with the misconduct of affairs at Washington as with Hull's management.

Hull House, a social settlement in Chicago, founded by Miss Jane Addams and Miss Ellen Starr in 1889. It is in the center of a poor foreign district, and from the first it was so successful and was conducted along such progressive lines that it became an acknowledged leader in the social settlement movement in the United States. See SOCIAL SETTLEMENTS.

Humane Societies. See CRUELTY TO ANIMALS, SOCIETY FOR THE PREVENTION OF.

Hu'manists. See PEDAGOGICS, subhead *Hu-manists*.

Humbert I (1844-1900), king of Italy, eldest son of Victor Emmanuel II. In the war of 1866, in which Italy joined Prussia against Austria, he took the field in command of a division and distinguished himself for his valor. In 1868 he married Marguerite of Savoy, and ten years later he succeeded his father on the throne. For a large part of his reign he was very popular with his subjects,

but much of his popularity was lost by reason of the excessive taxation which he was forced to impose on the country. He was assassinated by an anarchist.

Humblebee. See BUMBLEBEE.

Humboldt, *hum'bohlt*, FRIEDRICH HEINRICH ALEXANDER, Baron von (1769-1859), a German traveler and naturalist, born at Berlin, where his father held the post of royal chamberlain. He studied at the universities of Frankfort-on-the-Oder, Berlin and Göttingen, and also at the commercial academy in Hamburg. His first work was *Observations on the Basalt of the Rhine*. In 1791 he studied mining and botany at the mining school in Freiberg, and subsequently he became overseer of the mines in Franconia. He resolved to make a scientific journey in the tropical zones and arrived in Cumana, in South America, in 1799, and spent five years in exploring scientifically the region of the Orinoco and the upper part of the Rio Negro, the district between Quito and Lima, the City of Mexico and the surrounding country and the island of Cuba. In 1804 he returned to Bordeaux, bringing with him an immense mass of fresh knowledge in geography, geology, meteorology, botany, zoölogy and every branch of natural science. Humboldt selected Paris as his residence, no other city offering so many aids to scientific study, and remained there, arranging his collections and manuscripts, till 1805, after which he visited Rome and Naples. He eventually returned to Paris, where he prepared his first great work, a mammoth account of his journeys in South America and their scientific results.

In 1827, Humboldt, who had been offered several high posts by the government of Prussia, and had accompanied the king on several journeys as part of his suite, was persuaded to give up his residence at Paris and settle at Berlin, where he combined the study of science with a certain amount of diplomatic work. In 1829, under the patronage of Czar Nicholas, he made an expedition to Siberia and Central Asia, which resulted in some valuable discoveries, published in his *Central Asia*. In 1845 appeared the first volume of the *Cosmos*, his chief work, a vast and comprehensive survey of natural phenomena, in which the idea of the unity of the forces of nature is thoroughly grasped.

Humboldt, KARL WILHELM, Baron von (1767-1835), a German scholar, brother of Humboldt the naturalist. He studied at Berlin, at Frankfort-on-the-Oder and at Göttingen.

Humboldt River

"After traveling in France and Spain and acting as Prussian minister at Rome, he was called to fill the office of minister of the interior in connection with ecclesiastical and educational matters, and he had a most important share in bringing about the educational progress which Prussia has since made. In 1810 he became minister plenipotentiary to Vienna, took an active part in the conclusion of the Peace of Paris (1814) and at the Congress of Vienna (1815) and other great diplomatic transactions. He was for a time ambassador to London, and in 1819 he was an active member of the Prussian ministry; but he resigned and retired to his estate at Tegel. His works include poems and literary essays, but by far the most valuable are his philological writings, such as *Researches Regarding the Original Inhabitants of Spain in Connection with the Basque Language*; *On the Kawi Language of Java*, and *On the Diversity of Language and its Influence on the Development of Speech*.

Humboldt River, a river of Nevada, rising in Elko County. It flows in a southwest direction and empties into Humboldt Lake in Churchill County, 80 miles northeast of Carson City. Its waters are saline. The length is estimated at 375 miles.

Hume, DAVID (1711-1776), an eminent English historian and philosopher. He was destined for the law, but was drawn away by his love of literature and philosophy, and retired to France, where during three years of quiet and studious life he composed his *Treatise upon Human Nature*. The work was published at London in 1738, but, in his own words, "fell deadborn from the press." His next work, *Essays, Moral, Political and Literary*, met with a better reception. In 1746 and 1747 he accompanied General Sinclair in his expedition against France and in a military embassy to Vienna and Turin. He then published a recasting of his earliest work, under the title of an *Enquiry Concerning the Human Understanding*. In 1752 he published his *Political Discourses*, which were well received, and his *Inquiry Concerning the Principles of Morals*. The same year he obtained the appointment of librarian of the Advocates' Library, at Edinburgh, and began to write his *History of England*, of which the first volume appeared in 1754. This was received with the highest praise and greatly increased his reputation.

As a philosopher, Hume exercised a great influence on the thought of his own generation

Humming Bird

and of that which followed him. He contended that there could be no mental experience except sense impressions and the ideas which are the direct reproduction by memory of these impressions.

Humid'ity, in meteorology, the state of the atmosphere with respect to the amount of vapor it contains. The atmosphere is supplied with vapor by evaporation from the sea, rivers and lakes, the ground and plants. The amount of vapor that the air can contain depends upon its temperature, its capacity increasing as the temperature rises. When the air contains all the vapor that it can hold at a given temperature, it is said to be *saturated*. Next to oxygen and hydrogen, vapor is the most important constituent of the atmosphere. Dew, fog and rainfall depend upon its presence, and when existing in large quantities it is the principal cause of tornadoes and other violent storms. Vapor also equalizes the temperature. It reflects back to earth the heat which is radiated into the air, serving as a blanket to prevent the escape of heat. Without this prevention there would be much greater contrast between the temperature of day and night and of summer and winter than at present. The amount of humidity in the atmosphere is measured by the hygrometer. See **HYGROMETER**; **CLIMATE**; **CLOUD**; **DEW**; **FOG**; **RAIN**.

Humming Bird, a beautiful little bird, of which there are more than 400 species, living exclusively in America, abounding especially in the tropics. The name is given the birds because of the sound made by their rapidly moving wings in flight. Some humming birds are not larger than a bumblebee, and the largest do not exceed the sparrow in size. They have slender beaks, which are generally long and sometimes curved. The tongue is long, thread-like, forked at the point and capable of being protruded from the bill to a considerable distance. Humming birds never light to take food, but, hovering before a flower, supporting themselves by the rapid vibrations of their wings, they search the blossom for insects, which form a great proportion of



HUMMING BIRD

their food, and for the honey which the plants secrete. The little creatures are fearless, and will feed from the hand of a person who has gained their confidence. They build nests of wonderfully fine workmanship, which are lined within with soft wool and usually covered on the outside with lichens, which serve to conceal the nest. Two small eggs are laid (See NEST, color plate, Fig. 5). There are many species in the United States, but the only one found east of the Mississippi River is the *ruby-throated humming bird*. The tropical species vary remarkably in outward appearance. Some are plainly colored, while others are ornamented in numberless ways by brilliant patches of color on the throat, long graceful feathers in the tail, crests, ruffs, bunches of feathers upon the legs and a brilliant metallic luster to the feathers. See BIRDS, color plate, Eggs, for a picture of the egg of the humming bird.

Hum'perdinck, ENGELBERT (1854—), a German composer, born near Bonn. He studied at Cologne to become an architect, but soon abandoned this plan to take up music. He was a special friend and protégé of Richard Wagner's for the last few years of the great composer's life and soon gained renown as a vigorous supporter of the modern movement in music, which was given its first great impetus by Wagner. He is, perhaps, best known by his opera *Hänsel und Gretel*. Other compositions are the *Symphony in C* and *The Children of the King*. In all of his works his rendering of delicate folk lore and fairy themes is particularly successful.

Humphreys, *hum'friz*, ANDREW ATKINSON (1810-1883), an American soldier, born in Philadelphia. He graduated at West Point in 1831 and served at different times in the army and as government and private civil engineer. He joined McClellan's staff in 1861, was made brigadier general of volunteers in 1862 and in September of the same year commanded a division of the fifth corps of the Army of the Potomac, serving at Fredericksburg, Chancellorsville, Gettysburg and in Grant's campaign in Virginia in 1864. He was promoted to be major general of volunteers in 1863, after the surrender received a regular major general's brevet, had charge of the district of Pennsylvania and later, as brigadier general, commanded the engineer corps. He retired in 1879.

Hundred Days, *THE*, the term applied to the second period of Napoleon's power, from March 20 to June 28, 1815. On receiving word at

Elba that the restored Bourbon monarchy was unpopular in France and that the allies were unable to agree as to plans of settlement at the Congress of Vienna, he escaped from the island and returned to France. Great numbers joined him immediately, and he was able to force Louis XVIII to abdicate. He reorganized the government, with promises of liberal rule, and summoned an assembly to draw up a new constitution. The allies, however, promptly put a large army into the field against him, and at the Battle of Waterloo, which closed the campaign, he was defeated and forced again to abdicate.

Hundred Years' War, the name given to the struggle between France and England, which lasted with intermissions from 1337 to 1453. Edward III of England claimed the crown of France because his mother had been a sister of Charles IV of France, and this claim, together with minor differences, brought on the war. Although war was declared in 1337, there were no great battles fought until 1346, when, at the Battle of Crecy, the English gained a complete victory. Ten years later, at Poitiers, the French were again overwhelmingly defeated, but in spite of these advantages the English gradually lost ground and Du Guesclin succeeded in driving them from the country, so that when Charles VI came to the throne of France, England had practically no hold on the country. When, however, in 1415, war again broke out, France was so greatly disturbed by internal conflicts that she could make no head against her enemy, and Henry V was able in 1420 to compel Charles VI by the Treaty of Troyes to recognize him as his heir. Under the regency of the duke of Bedford, the uncle of the infant son and successor of Henry V, England continued to make headway in France, but in 1429, through the efforts of Joan of Arc, matters changed, and the English were gradually forced to relinquish their gains. By the close of the war Calais was the only French territory which remained in England's hands.

Hun'gary. See AUSTRIA-HUNGARY.

Hunger. See APPETITE.

Hungerford, MRS. MARGARET WOLFE (1855-1897), an Irish novelist, better known as The Duchess. Her novels include *Phyllis*, *Beauties' Daughters*, *A Maiden All Forlorn*, *A Mental Struggle*, *Undercurrents* and *Molly Bawn*. They have little literary value and are exceedingly melodramatic, but are on the whole cleverly written.

Hunk'ers. See BARNBURNERS.

Huns

Huns, a nomadic and warlike people of the Mongolian race, part of whom entered Europe, probably in the fourth century after Christ. They continued to extend their dominion along the Danube till the time of Attila (434 A. D.), who, uniting the whole Hunnish power, became the most powerful prince of his time. His defeat near Châlons was the commencement of the decline of the power of the Huns, and within a generation after his death, in 453, the great Hunnish Empire had completely disappeared, and the race had been absorbed among other barbarous peoples.

Hunt, HELEN FISKE. See JACKSON, HELEN FISKE HUNT.

Hunt, JAMES HENRY LEIGH (1784-1859), an English poet and essayist. He was educated at Christ's Hospital, London, entered the office of his brother, an attorney, and afterward obtained a situation in the war office. In 1808, in conjunction with his brother John, he started the *Examiner*, which soon became prominent for the fearlessness with which public matters were discussed. *Foliage*, a collection of original poems and translations, appeared in 1818, and in 1819 the *Indicator* was started, a weekly journal on the model of the *Spectator*, which contained some of his best essays. In 1822 he went to Italy, on an invitation from Byron and Shelley, and, in conjunction with the former, carried on a newspaper called the *Liberal*, which proved unsuccessful and was shortly discontinued. Among Hunt's works may be mentioned *The Story of Rimini*; *Palfrey, a Love Story of Old Times*; *Legend of Florence*, a play; *Men, Women and Books*, and an *Autobiography*.

Hunt, MARY HANNAH (1830-1906), an American teacher and temperance reformer, born at South Canaan, Conn. She became interested in investigations of the nature and effects of alcoholic drinks and other narcotics on the human system, and as the result of her studies she advocated compulsory instruction in what is called *scientific temperance*, in the public schools of the country. Under her influence and direction laws regarding such instruction are on the statute books of Congress and of nearly every state of the Union. Similar laws have also been adopted in Canada, Chile and several other countries. Mrs. Hunt was the organizer and the superintendent of the department of scientific temperance instruction for the World's Christian Temperance Union. She was the founder and editor of *School Physiology*, a monthly journal.

Hunt

Hunt, RICHARD MORRIS (1828-1895), an American architect, born at Brattleboro, Vt., the brother of William Morris Hunt. He studied architecture in Geneva, Switzerland, and Paris, and later traveled through Europe, Asia and Africa. Returning to America in 1855, he was made chief architect of the extension of the National Capitol. He also designed the Lenox Library, New York, the United States Naval Observatory at Washington, the Administration Building of the World's Fair at Chicago and many other buildings and monuments throughout the country. He also planned some of the finest private mansions in the United States, including that of W. K. Vanderbilt, New York, and the country home of George Vanderbilt, at Biltmore, N. C. He received many decorations from foreign learned societies and was recognized as one of the most influential members of his profession in the United States.

Hunt, WILLIAM HOLMAN (1827-), an English painter, one of the best of modern painters of religious subjects, born in London. He was trained in the Royal Academy school and began to exhibit in 1846. He belongs to the so-called Pre-Raphaelite school of English artists. In 1853 his *Claudio and Isabella* first attracted public attention, followed next year by the *Light of the World* (Christ bearing a lighted lantern). Mr. Hunt then made a journey to the East, the fruits of which are observable in the local coloring and strength of realization in his succeeding pictures of Eastern life, among which are *The Scapegoat*, *The Finding of the Saviour in the Temple*, *Shadow of Death and Triumph of the Innocents*. Hunt's pictures have been criticised for the minuteness of detail and the care with which everything is done, but they are full of strong feeling.

Hunt, WILLIAM MORRIS (1824-1879), an American painter, born at Brattleboro, Vt., and educated at Harvard University. He studied in Europe, where he became a close friend and follower of Millet. He returned to the United States in 1855 and became a teacher of painting in Boston. In all his work he showed a remarkable technic and a fine feeling for color. Among his most important paintings are *The Flight of Night* and other mural decorations in the New York State capitol at Albany, several portraits of famous Americans and numerous figure subjects, many of which hang in the Boston Museum, notably *Marguerite*, *The Hurdy-Gurdy Boy* and *Girl with the Kitten*. In later life he devoted himself to landscape painting.

Hunter, DAVID (1802-1886), an American soldier, born at Washington, D. C., and educated at West Point. He served on the frontier and in the Mexican War. During the Civil War he commanded a division at the first Battle of Bull Run and was seriously wounded, was afterwards appointed major general of volunteers, was given command of the western and southern departments in turn and came in conflict with the government at Washington by issuing a premature order for the abolition of slavery in the states of Georgia, Florida and South Carolina. He later served in West Virginia and in Virginia and at the close of the war was brevetted brigadier general and later major general in the regular army.

Hunter, JOHN (1728-1793), an eminent English surgeon, born at Glasgow, Scotland. After industrious and thorough study of anatomy he became house surgeon at Saint George's Hospital in 1756 and later was military surgeon in France and Portugal, where he stayed for two years. On his return to London he came into prominence at once and was regarded as the ablest physician of his day. One of his most important inventions was the cure of aneurism in an artery, by tying it on the side toward the heart. He collected various and numerous specimens in his large private museum, which, after his death, was purchased by the government and presented to the Royal College of Surgeons.

Hunter, ROBERT MERCER TALIAFERRO (1809-1887), an American politician, born in Essex County, Va., and educated at the University of Virginia. He entered politics in 1833, being elected to the state legislature, and four years later was chosen to Congress as a Democrat. He vigorously upheld the interests of the South in opposition to protection and to the national bank and became speaker of the House in the Twenty-sixth Congress. In 1847 he was elected United States senator and served until the Civil War, being expelled after his withdrawal in July, 1861. During this period he favored the slave power, was the author of the low tariff of 1857 and was a prominent candidate for the nomination for president in the Democratic convention of 1860. He was a member of the provisional Confederate congress and was then chosen secretary of state, but resigned to enter the Confederate senate, where he showed himself a warm adversary of President Davis. He was one of the Confederate commissioners who labored for peace in 1865, at what is known as

the Hampton Roads Conference. He took no part in national politics after the close of the war.

Hunting, a sport which has been popular with mankind from the earliest times and which is still indulged in by all civilized people, though for many years it has been considered sportsmanlike to hunt game animals during certain seasons of the year only and in such ways as to give the animal a fair show for its life. In fact, in most parts of the United States, as well as in most countries of Europe, there are game laws which forbid shooting during the breeding season and which sometimes restrict it to a very limited period each year. Certain animals which are destructive, however, may be hunted at all times, and in many states a premium is placed on their death (See GAME LAWS).

Since the invention of firearms the killing of game by shooting is the most common way. The use of dogs to detect the presence of game and to rouse it is common, though in some states the hunting of deer and other animals with dogs is forbidden. Among the game birds of the United States, those most sought for are the partridge, the grouse, the plover, the quail, the woodcock and various species of ducks, though in different localities there are other birds almost equally favored. Among the mammals, squirrels, hares, rabbits and deer are most highly regarded. In most states little restriction is placed on hunting squirrels and rabbits, but the open season for deer is very short, sometimes not exceeding fifteen days in the course of a year.

The refinements of modern life have taught us the charm that many wild animals possess and have led to the protection of song birds and other harmless creatures to such an extent that in many cities and towns the squirrels are familiar, everyday visitors to many homes, where they are fed and guarded by the children, instead of being hunted as they were formerly. The public schools have done much to educate children to see in the birds a beauty that is utterly destroyed when life is extinct, and accordingly a saner regard for them is growing among the people. So long as there is a demand for game for the table, or for furs and plumage for wear and decoration, there will be hunting for the market, and professional hunters and trappers will continue to make their living, but it is not probable that hunting as a sport will increase in popularity.

Huntingdon, PA., the county-seat of Huntingdon co., 98 mi. w. of Harrisburg, on the Juniata River and on the Pennsylvania and other rail-

Huntington

roads.- The borough is in an agricultural and fruit-growing region and is near deposits of iron, coal, fire clay and limestone. The town contains flour mills and manufactories of machinery, stationery, knit goods, furniture and other articles. It is the seat of Juniata College and of the state industrial reformatory. The place was settled in 1760 on the site of a famous indian council ground. Population in 1900, 6053.

Huntington, IND., the county-seat of Huntington co., 24 mi. s. w. of Fort Wayne, on the Little River and on the Wabash and the Erie railroads. The city has extensive water power, and the manufactures include bicycles, shoes, pianos, agricultural implements and cement. There is also a trade in coal, lime and agricultural produce. It is the seat of a United Brethren college. Population in 1900, 9491.

Huntington, N. Y., a town of Suffolk co., on Huntington Bay of Long Island Sound, 30 mi. e. by n. of New York, on the Long Island railroad. The surrounding country is agricultural. The town has manufactures of pottery and brick, but it is of especial importance as a summer resort and residential suburb. Population in 1905, 10,236.

Huntington, W. VA., the county-seat of Cabell co., 52 mi. w. of Charleston, on the Ohio River and on the Baltimore & Ohio, the Chesapeake & Ohio and other railroads. The city is an important commercial center with steamship connection on the river, and it has foundries, machine shops, packing houses, lumber and planing mills and manufactories of paints, glass, stoves and other articles. The West Virginia Asylum for Incurables and Marshall College, which is the state normal school, are located here. The place was settled in 1871 and was named in honor of Collis P. Huntington. Population in 1900, 11,923.

Huntington, DANIEL (1816-1906), an American artist, born in New York. He was educated at Hamilton College and studied under S. F. B. Morse and Inman. After a visit to Europe in 1839, he returned to New York and devoted himself to portraits, but executed also a great number of genre and historical pieces. Among his later works are *Philosophy and Christian Art* (1878) and *Goldsmith's Daughter* (1884). Among his portraits are those of President Lincoln and United States Senator John Sherman. Among his other works are *Lady Washington's Reception Day*, *Florentine Girl* and *Mercy's Dream*.

Huntsville, ALA., the county-seat of Madison co., 100 mi. n. of Birmingham, on the South-

Huron

ern and the Nashville, Chattanooga & Saint Louis railroads. The city is in the fertile Tennessee River valley and has an extensive trade in cotton, fruit and live stock. It is the most important cotton manufacturing center in the South. Foundries, machine shops, brickyards and various other manufactories are also located here. The city contains Huntsville Female College, the Huntsville Female Seminary, a state normal and industrial school and the Central Alabama Academy. Population in 1900, 8068.

Hunyady, hun'yah dy, JANOS (about 1387-1456), a national hero of Hungary. In all the wars against the Turks, which were agitating his country, he took a prominent part. When at the Battle at Varna, in 1444, the Hungarian king, Ladislas, was killed, Hunyady was made regent during the minority of the new king, Ladislas Posthumus. Four years later he was defeated at Kossovo in Servia and was held a prisoner for a time by the Servians. His greatest victory was one in 1456 over Mohammed II, the conqueror of Constantinople, who was attempting the siege of Belgrade. He died a few days after this battle. The credit for preventing the Mohammedans from establishing an empire in central Europe is due to Hunyady more than to any other one man.

Hurd'ling. See **ATHLETICS**.

Hurd'y-gurd'y, a medieval stringed instrument, played by turning a handle. Its tones were produced by the friction of a wheel acting as a bow against four strings, the length and pitch of which were regulated by the fingers or by keys. The name is also commonly applied to the street organ, or barrel organ, built upon the same principle, the wheel being replaced by a cylinder armed with pegs, which, as the cylinder is revolved, pick the strings or press valves in pipes, admitting air currents which produce the tones.

Hu'ron, a powerful tribe of indians that lived east of Lake Huron near Georgian Bay. When Champlain knew them in 1609, the Huron were allied to the Algonquian tribes and were at war with the Iroquoian, although the Huron naturally belonged to the latter group. Champlain, adopting the cause of the Huron, engaged in two expeditions against the Iroquois, in both of which he was successful. Naturally, the Huron became loyal allies of the French and accepted the teachings of the Jesuits, but the Iroquoian tribes, having learned the use of firearms, were too strong for their Huron enemies and ultimately drove the lat-

ter out of their country. See IROQUOLAN INDIANS.

Huron, LAKE, one of the chain of five great lakes in the central part of North America. It lies between and connects Lake Superior and Lake Erie and also joins Lake Michigan. It washes the shores of the State of Michigan on the west and of the Province of Ontario on the east. Lake Huron lies 582 feet above sea level and is third in size of the Great Lakes, being about 250 miles long, 190 miles wide and from 200 to 700 feet deep, and having a total area of 22,322 square miles. The lake contains several thousand islands in its northern part, of which the largest is the Grand Manitoulin, which is about 107 miles long and from 4 to 25 miles wide. The waters of the lake are very clear, pure and cold and abound in fish. There are few good harbors, the best being Saginaw Bay and Thunder Bay on the west shore. Its principal ports are Goderich and Kincardine, Owen Sound and Collingwood, Ont., and Bay City, Saginaw and Cheboygan, Mich. There is a large arm of the lake on the east, known as Georgian Bay. See GREAT LAKES, THE.

Hurricane, the name of large revolving storms that form in the region of the West Indies. The term is also popularly, though incorrectly, applied to any wind having sufficient force to uproot trees and destroy buildings. The West Indian hurricanes are revolving storms, with a diameter, in the beginning, of from 100 to 300 miles. They occur only during the late summer and autumn, being most frequent in September and October, and are caused by the intense heat over portions of the sea where they originate.

The wind blows in a circular course, whose direction is contrary to that of the hands of a clock. In the center of the storm no rain falls, and as the current is upward, no wind is perceived. This area is characterized by a heavy sea and frequently by a clear sky, for which reason it is termed the *eye* of the storm. The intensity of the storm is greatest near the place of its origin and diminishes as the diameter of the circle covered increases. At the beginning the velocity of the wind is very great, being estimated in some instances as high as 200 to 300 miles an hour, and the rain falls in torrents.

These storms generally move toward the northwest until they reach the coast of the United States, when they turn toward the northeast and follow the coast from about the

latitude of Cape Hatteras to Nova Scotia. As they advance their area increases and their violence diminishes, but they usually cause heavy rain or snow, and occasionally the wind is of such force as to cause considerable damage to shipping and to towns along the coast. The most extensive hurricanes extend inland as far as Indiana, but by the time a storm has reached this limit, its force has been expended. See CYCLONE; TORNADO; TYPHOON.

Husband and Wife, a man and a woman married to each other (See MARRIAGE). The legal relations existing between husband and wife have within two centuries undergone a marked change. According to the old English common law, at marriage the person of the wife was merged with that of the husband and all of her personal and property rights were transferred to him. Many of the common law principles, however, have been changed by the development of equity in England and of statute law in America, so that to-day the relations between husband and wife are in most respects those of practical equality.

Of the common law rules which still prevail, though in some ways modified by statute and equity, the following are of most importance: (1) It is the husband's right to determine the place of residence and the wife's duty to live with the husband, her legal residence being identical with his. (2) It is the husband's duty to provide support for the wife in accordance with his income and ability, and it is the wife's duty to render such domestic service as is reasonable and necessary. (3) The common law rule that at marriage the husband becomes the absolute owner of the personal property and has the management and obtains the profits of all the real estate of the wife is still in force in some jurisdictions, but has now been generally changed so as to allow the wife to possess a separate estate, over which she has general direction. The husband's right may also be somewhat limited by a pre-marriage or post-marriage settlement (See SETTLEMENT). (4) The husband is liable for debts contracted by the wife before marriage. (5) The husband is liable for civil offenses committed by the wife during married life. If these offenses or crimes are committed in his presence, the presumption is that they were done under coercion, and the wife is not found guilty unless this presumption is overcome. (6) The husband after marriage has the same power to make contracts as before, but the power of the wife in

this direction is lost, except in cases involving her separate estate. She may, however, act as the agent of her husband in purchasing necessities for the home. (7) The wife cannot dispose of will of either real or personal property, except of her separate estate. (8) At marriage the wife attains a so-called *dower* right in an undivided one-third of the husband's real property. The latter therefore cannot convey real property without the consent of his wife, who thereby forfeits her dower right in the same. (9) Neither husband nor wife is a competent witness in cases in which the other is a party, except in certain cases instituted in order to secure protection of one against the other. (10) Formerly, neither husband nor wife could sue the other, the only remedy against civil injuries being in separation or divorce; but now the courts of most countries allow the wife to sue in equity for certain rights recognized in equity, such as those established by settlement. See **DIVORCE**.

Huss, JOHN (1373-1415), a religious reformer, born at Hussinecz, Bohemia. He studied philosophy and theology in the University of Prague, received the degree of A. M. in 1396 and became professor in the university in 1398. Later he was made dean of the philosophic faculty and preacher for the Bohemians in Bethlehem Church, having been ordained priest in 1401. The *Dialogus* of Wyclif, spuriously bearing the endorsement of Oxford University, was publicly read in Prague and so fascinated Huss that he translated it into Bohemian. His translation was widely circulated among the people and attracted considerable attention. Huss next openly denounced the censures pronounced by the Church on the heretical writings of Wyclif, and in his sermons he gave the latter unstinted praise, violently denouncing what he regarded as ecclesiastical abuses. Consequently, Pope Alexander issued a bull prohibiting preaching outside of collegiate, monastery and parish institutions. Huss defied the papal ban and was called to Rome by John XXIII to defend his principles. Refusing to comply with the summons of the pope, he was excommunicated in 1411. But setting aside all authority, he undertook, together with Jerome, a public denunciation of papal indulgences. For this action he was expelled from Prague. In exile he wrote his *Tractatus de Ecclesia*, which denied all Church authority. Through the influence of the pope, King Wenceslaus and Emperor Sigismund prevailed on Huss, under promise of a

safe conduct, to present himself before the Council of Constance, which opened on November 5, 1414. The pope, in order to free Huss from all embarrassment, withdrew the ban of excommunication, and to save him from external influence, caused him to be placed in the Dominican monastery near Lake Constance. He had three hearings before the Council, which condemned his doctrines and turned him over to the civil authorities, "praying that his life be spared and he be condemned to perpetual imprisonment." Huss was not allowed to speak in his own behalf nor to have any one speak for him. The laws of the Empire at this time regarded heresy as a civil offense and provided death for refusal to retract it. Huss was accordingly condemned to be burned at the stake. This sentence was executed July 6, 1415, and his ashes were thrown into the Rhine.

Hussites, the followers of John Huss (See **HUSS, JOHN**). After the death of Huss, his adherents took up arms for the defense of their principles, and under the leadership of Ziska, captured Prague, fortified Mount Tabor and repeatedly defeated the troops sent against them by the emperor Sigismund, who had succeeded to the crown of Bohemia. Ziska died in 1424 and was succeeded by Procopius, who also distinguished himself by many victories. The excesses of this party, however, who were called the Taborites, alienated the moderate Hussites, who called themselves Calixtines. These latter, after gaining certain concessions, such as the preaching of the gospel in the Bohemian tongue and the reform of clerical abuses, finally united with the Catholics by the Compactata of Prague in 1433, to acknowledge Sigismund as king. The Taborites afterward declined as a political party, finally becoming merged in the Bohemian Brethren.

Hutchinson, KAN., the county-seat of Reno co., 40 mi. n. w. of Wichita, on the Arkansas River and on the Missouri Pacific, the Atchison, Topeka & Santa Fé and the Chicago, Rock Island & Pacific railroads. It is a beautiful and growing city, near the center of the salt industry of the state, and it also has an important trade in live stock and agricultural produce. The salt supply seems practically unlimited, and the several plants turn out from 4000 to 6000 barrels daily. Other industries are meat-packing establishments and manufactories of machinery, boilers and other articles. The state industrial reformatory is located here. The

place was settled in 1872 and was incorporated two years later. Population in 1905, 11,215.

Hutchinson, ANNE (about 1590-1643), a religious enthusiast in colonial America, born in Lincolnshire, England. She married William Hutchinson and in 1634 went to Boston, Mass. She had peculiar theological views, held meetings, lectured and denounced the Massachusetts clergy. She was tried for heresy and banished from the colony, and with some of her friends she went to Rhode Island and started a settlement at Portsmouth. At the death of her husband she went to a new settlement in New York, where she and her daughters were massacred by the indians.

Hutchinson, THOMAS (1711-1780), the last royal governor of Massachusetts. He was born in Boston and graduated from Harvard University, entered a business career and amassed a comfortable fortune. He early became prominent in government affairs and was rapidly promoted by the suffrage of his constituents until he became lieutenant governor and finally chief justice of the colony. While occupying this office he issued the famous Writs of Assistance. He opposed the Stamp Act on the grounds of expediency, but considered it legal and constitutional and labored earnestly to enforce it, thus incurring the antagonism of the people. His house was sacked during this period and many valuable books were destroyed. He became governor in 1770, was extremely unpopular and when military law was proclaimed in 1774 went to England, where he lived until his death. His *History of Massachusetts Bay* in three volumes is one of the most valuable histories of colonial times.

Hutton, LAURENCE (1843-1904), an American essayist and critic, born in New York City. From 1872 to 1874 he was dramatic critic of the *New York Evening Mail*, and from 1886 to 1898 he was literary editor of *Harper's Magazine*. He had a prominent part in the formation of the Authors' Club and of the International Copyright League. His works include *Plays and Players*, *Curiosities of the American Stage*, *Actors and Actresses of Great Britain and the United States*, written in conjunction with Brander Matthews. He also published a set of *Literary Landmarks* of various European cities.

Huxley, THOMAS HENRY (1825-1895), a famous English naturalist. He was graduated from the University of London in 1845 and entered the royal navy as assistant surgeon the next

year. He sailed with H. M. S. *Rattlesnake* on a surveying expedition to Australasia, during which he sent a number of valuable papers to the Royal Societies. He was at different times professor of natural history in the school of mines, Fullerian professor of physiology to the



THOMAS HENRY HUXLEY

Royal Institution, Hunterian professor in the Royal College of Surgeons, president of the British association meeting held at Liverpool in 1870, lord rector of Aberdeen University in 1872, secretary of the Royal Society, substitute professor of natural history for Professor Wyville Thompson, at Edinburgh, a member of various royal commissions and inspector of salmon fisheries. He resigned this and almost all his other offices in 1885 on account of ill health. Among his works are *The Oceanic Hydrozoa*, *On the Theory of the Vertebrate Skull*, *Man's Place in Nature*, *On Our Knowledge of the Causes of the Phenomena of Organic Nature*, a series of lectures to working men, delivered in 1862, *Elements of Comparative Anatomy*, *Elementary Physiology*, *Introduction to the Classification of Animals*, *Critiques and Addresses*, *American Addresses*, *Physiography* and *Anatomy of Invertebrate Animals*.

Hyacinth, *hi'a sinth*, a genus of bulbous plants, belonging to the lily family and including about thirty species, among which the garden hyacinth is celebrated for the immense varieties

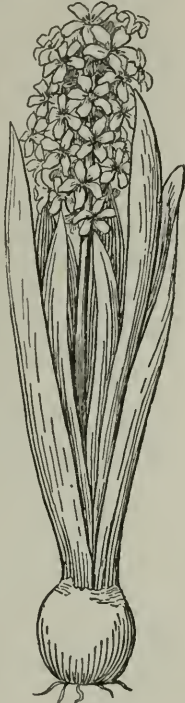
Hyatt

which culture has produced from it. It is a native of the eastern shores of the Mediterranean Sea and was first cultivated as a garden flower by the Dutch, about the beginning of the sixteenth century. The drooping, bell-shaped flowers of almost all colors, both double and single, grow on an erect stock from the center of the plant. An old Greek myth accounts for the origin of the flower as follows: Apollo, the Greek god, had as a friend a beautiful youth named Hyacinthus, who was killed one day in a game of quoits. As a token of his love for the youth and sorrow at his death, Apollo caused a beautiful purple flower to spring from the drops of blood that fell from the brow of Hyacinthus.

Hy'att, ALPHEUS (1838–1902), an American naturalist. He graduated at Harvard College and at the outbreak of the War of the Rebellion entered the army and obtained the rank of captain. After the war he resumed his studies and served in various scientific positions in the East. Later he was made custodian of the collections of the Boston Society of Natural History, and in 1881 he became curator. He was a member of various scientific societies and was one of the editors and founders of the *American Naturalist*. His most important work was among the fossils of invertebrate animals, and in his studies he collected many facts which went far toward establishing the theory of evolution. Most of Hyatt's works are of a scientific character. One of the best known is a classification of fossils.

Hyde Park, MASS., a town in Norfolk co., 8 mi. from the statehouse in Boston, on the Neponset River and on the New York, New Haven & Hartford railroad. It has a beautiful location and extensive manufactories of cotton, woolen and rubber goods, paper, machinery and other articles. Population in 1905, including several villages, 14,510.

Hyderabad, *hi'dur a bahd'*, a city, the capital of a native state of the same name, also



HYACINTH

Hydra

called the Nizam's Dominions, in southeastern India, east of Bombay. It is situated on the River Musi, at an elevation of 1672 feet above the sea. Among the chief buildings are the extensive palace of the nizam; the house of the British resident and adviser; the Char Minar, or Four Minarets, built about 1590 as a Mohammedan college, but now used for warehouses; the Jama Musjid, or cathedral mosque, designed after the one at Mecca. The city is an important railroad and commercial center and has manufactories of silks, trinkets and turbans. Population in 1901, 448,466.

Hy'der Ali, *ah'le*, (about 1720–1782), a distinguished Indian prince, son of a general in the service of the rajah of Mysore. By his military talents he became the actual ruler of Mysore, and in 1762 he deposed the rajah and had himself chosen to that position. He encouraged agriculture and commerce, reorganized the army and so greatly extended his dominions that in 1766 they contained 84,000 square miles and afforded an immense revenue. He was engaged in two wars with the British.

Hydra, *he'dra* or *e'dra*, an island of Greece, lying about 4 mi. off the southeast coast of Argolis, in the Peloponnesus. It is about 11 miles long and 3 miles broad. The coast is rocky and steep, having an elevation of 1800 feet, and the surface is barren. The chief town and seaport is Hydra. In ancient times the island was a dependency of the city of Hermione, and during the fifteenth and sixteenth centuries fugitives from different parts of Greece settled it. In the Grecian war of independence the people took a most active part, contributing most liberally to the cause of patriotism. After 1820, the islanders were considered the richest in the Aegean Sea. They carry on an extensive trade with England, the Baltic and even America. Lately, however, this has declined, and the population now is estimated at only 7000.

Hy'dra, in Greek mythology, a celebrated monster which lived in the neighborhood of Lake Lerna, in the Peloponnesus. Some accounts give it a hundred heads, others fifty and others nine, but all agree that as soon as one head was cut off, two others immediately grew in its place, if the wound was not seared by fire. To destroy this monster was one of the labors of Hercules, and he succeeded only with the assistance of Iolaus, who, as each head was cut off, applied a burning iron to the wound. The central head, which was immortal, Hercules buried under a stone.

Hydra

Hydra, **FRESH-WATER**, or **Fresh-water Polyp**, a small animal, found in pond water. It can be seen easily with the naked eye, as it is about the thickness of fine sewing-cotton and has a length of from one-quarter to one-half of an inch. Hydraz are found adhering by one end to twigs or weeds in the water. On the other end are a number of very delicate threads or filaments, called *tentacles*. If the hydra is watched under a microscope, it will be noticed that its form is continually changing. Sometimes it extends itself so much that its length is sixteen times its diameter and the tentacles



FRESH WATER HYDRA

appear like long, delicate filaments. At another time it contracts itself into an almost globular mass, and the tentacles appear like little blunt knobs. Besides these two movements, the hydra is able to go slowly from place to place. It is a voracious creature. When a water flea or any other living thing that may serve as food touches one of the tentacles, it becomes suddenly paralyzed by the barbed stinging cells which are literally shot out of the tentacle into the body of the animal, causing it to adhere to the tentacle. This tentacle and the others gradually contract until the prey is brought near the mouth of the hydra, which expands widely and draws the prey down into the digestive cavity. Hydraz reproduce by budding. If a hydra be cut in two, it appears that within certain limits each portion will develop into a complete animal. See COELENTERATA.

Hydrangea, *hi dran'je ah*, a genus of shrubs or herbs, belonging to the saxifrage family and containing about thirty-three species, natives of Asia and America. The garden hydrangea is a native of China and was introduced into Great Britain by Banks in 1790. It is a favorite plant,

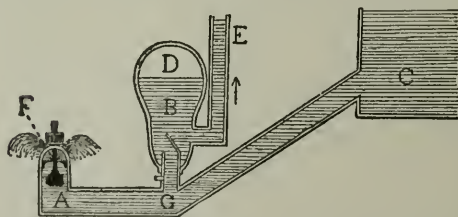
Hydraulic Ram

because of the beauty and size of its flowers, which are white, pink or blue in color.

Hydraulic Engine, an engine operated by water under pressure. When the water is applied in such a way as to produce a direct rotary motion, the machine is usually termed a water wheel or water motor (SEE WATER WHEELS; TURBINE WHEEL). The term engine is more strictly applied to a water motor which operates on a plan similar to that of the steam engine, that is, being constructed with cylinders, pistons and valves (SEE STEAM ENGINE). The water is admitted and withdrawn alternately at opposite ends of the cylinder and forces the piston from one end to the other. The piston rod is connected with a crank on the shaft, and its reciprocating motion is thus changed to a rotary motion when this is necessary. Hydraulic engines of this sort are occasionally used where a slow, steady motion and considerable power are required, as in operating hoisting cranes in foundries and working certain patterns of elevators, but the introduction of the electric motor has largely displaced them for the latter purpose. A more common form of hydraulic engine is seen in the machines used for pumping the bellows of large organs by water power. This engine is really a pump, and the reciprocating motion of the piston is transferred directly to the lever which works the bellows, no rotary motion being necessary.

Hydraulic Press. See HYDROSTATIC PRESS.

Hydraulic Ram, a machine for using the force of a stream of water to raise a portion of



the stream to a level higher than that of the ram. In the figure, C represents the reservoir and G the pipe through which the water flows. At A the pipe is turned upward and flows by a cone-shaped valve, usually made of iron. At G there is a pipe connecting with an air chamber, D. The entrance to this chamber is through the valve B. The working of this machine is as follows: When the water begins to run through the pipe G, the valve is in its lowest position and allows the water to flow out through the orifice F. This flow continues until the force of the stream

of water through the pipe is sufficient to raise the valve and close the orifice. When this is closed, the flow of water in G suddenly stops and the force of the current is such as to drive a portion of the water through the valve B into the chamber. As soon as the flow in G stops, the valve at F again falls to its first position and the flow is again started. The water is forced into the delivery pipe E, and a constant flow is maintained by the elastic force of the air in D.

Hydraulic rams are used where the source of water is below the level of the place in which the water is required for use. Only a small portion of the water which flows through G passes through the valve at B; therefore these machines are not practicable, except where the quantity of water at the source is much greater than that needed for use.

Hydraulics, the science which treats of the laws of flowing liquids. Two general principles are always considered in applying these laws. They are:

(1) The velocity of a jet of water is equal to that of a body falling from the surface of the water. If a jet flows from a dam ten feet below the surface of the water, it will have the same velocity as a stone which has fallen ten feet.

(2) A jet of water will rise to the level of its source. If a cistern is on a support twenty-five feet high and a pipe is attached leading to the ground and having an opening bent upward, the jet issuing from the pipe theoretically will rise as high as the surface of the water in the cistern. Because of friction and the resistance of the air, however, this result will not be quite obtained. The practical application of the laws of hydraulics has given rise to the science of hydraulic engineering. See **HYDRAULIC RAM**; **HYDROSTATICS**; **WATER WHEELS**.

Hydrocarbons, a series of compounds which consist of carbon and hydrogen only. They are produced chiefly by the decomposition of organic substances, either slowly by natural causes or by artificial means, as in the case of the destructive distillation of coal for the purpose of making gas. Certain of the hydrocarbons are also found in the gums which exude from trees. Hydrocarbons are the simplest of the carbon compounds and are commercially of considerable importance, forming the principal part, as they do, of turpentine, benzine, paraffin, petroleum, illuminating gas and gutta-percha.

Hydrochloric, *hi'dro klor'ik*, **Acid** or **Muriatic Acid**, a gaseous compound of equal volumes of hydrogen and chlorine. It is set free

during volcanic eruptions and is found in the water which collects in the crevices of mountains, as well as in rivers which take their rise in volcanic formations, especially in South America. It may be produced by decomposing common salt with sulphuric acid or by bringing equal volumes of chlorine and hydrogen together and exposing the mixture to diffuse daylight. It explodes in direct sunlight. Hydrochloric acid is colorless and has a pungent odor and an acid taste. It is quite irrespirable, extinguishes flame and dissolves very readily in water. The chief use of hydrochloric acid in the arts is to supply chlorine to the bleaching powder manufacturer. It is also used in the preparation of glue, phosphorus, carbonic acid and artificial waters. In medicine it is used diluted as a tonic and astringent. In a concentrated form it is a powerful caustic.

Hydrocyanic, *hi'dro si an'ik*, **Acid**. See **PRUSSIC ACID**.

Hydrofluoric Acid, an acid which may be obtained either in liquid form or in the form of a colorless gas. Both the dry and the liquid forms are active poisons and act upon the skin with great virulence. Hydrofluoric acid is used chiefly for etching upon glass. The glass is covered with a thin coating of etching wax, and the design is traced through the wax down to the glass with a fine-pointed instrument. The plate is then treated either with an aqueous solution of the acid or is exposed to the gas itself. After a sufficient length of time the wax is dissolved away and the design becomes visible. In chemistry, hydrofluoric acid is used to decompose and dissolve silicates in mineral analysis.

Hydrogen, *hi'dro jen*, an important elementary substance, one of the elements of water and a component of all vegetable and animal products. It may be obtained by passing the vapor of water over red-hot iron filings, or by submitting water to the action of an electric current, whereby it is decomposed into its elements, hydrogen and oxygen. Pure hydrogen is a colorless, tasteless, inodorous gas; it is very inflammable, burning with a pale, very slightly luminous, but intensely hot, flame; it is a powerful refractor of light. Hydrogen is the least dense and the most rapidly diffusible of all the gases and the lightest body in nature, being about one-fifteenth as heavy as atmospheric air. In consequence of its extreme lightness it is regarded as unity in referring to the atomic weight of bodies, and it has also been assumed as the unit in speaking of the specific gravity of gases,

Hydrogen Dioxide

although common air is the more generally received standard. Hydrogen cannot support respiration, but is not directly poisonous. Two volumes of hydrogen with six of air form an explosive mixture. The most intense heat that can be produced is caused by the burning of hydrogen in oxygen gas, and this principle has been applied to increase the temperature of blast furnaces in iron works by making the gases pass separately through heated tubes to the furnace. Hydrogen is only slightly soluble in water, nor is there any other liquid which is capable of dissolving it in great quantity. It unites with all other elementary gaseous bodies, and it forms with them compounds, not only of great curiosity, but of vast importance and utility; with nitrogen it forms ammonia; with chlorine it forms hydrochloric acid, and with fluorine it forms hydrofluoric acid.

Hydrogen Dioxide or Oxygenated Water or Peroxide of Hydrogen, a compound of hydrogen and oxygen which contains twice as much oxygen proportionately as water. It is found in small quantities in the juices of some plants and in rain water and snow. When the water which accompanies the artificial hydrogen dioxide has been evaporated, there is left an oily liquid which is colorless and odorless, but which has a bitter taste and will blister the skin if brought in contact with it. Hydrogen peroxide is a particularly valuable bleaching agent, and as a medicine it has proved an excellent antiseptic. It is used in cases of diphtheria, and, taken internally, it has proved an aid in cases of indigestion. Compounds advertised to bleach the hair are usually based on dilute solutions of this substance.

Hydrogen Sulphide, *sul' fide*. See SULPHURETED HYDROGEN.

Hydrography, *hi drog'ra fy*, that branch of geography which has for its object the description of the water on the surface of the globe, whether in seas, lakes or rivers. It may deal with the rivers, watersheds and lakes, of a particular country; and it may also embrace the determination of winds, currents and other departments of marine surveying. Great Britain, France, the United States and other leading countries maintain hydrographic departments, under whose direction soundings, coast surveys and other maritime affairs are conducted.

Hydrom'eter, an instrument for measuring the specific gravity of liquids. The hydrometer in common use consists of a small glass tube, enlarged at the lower end so as to form two

Hydrostatic Press

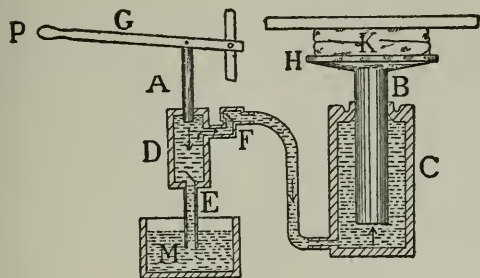
bulbs, one above the other. A weight, usually consisting of mercury or shot, is placed in the lower bulb to keep the instrument in an upright position. The upper part of the tube, which forms the stem, is marked with a graduated scale, zero being the point to which the hydrometer sinks when immersed in water. If immersed in a liquid heavier than water, it will not sink to the zero point, while, if immersed in a lighter liquid, it will sink beyond this point. Special hydrometers are manufactured for different purposes, such as for ascertaining the purity of milk and alcohol.

Hydrop'athy. See HYDROTHERAPY.

Hydrophobia, *hi dro fo'be ah*, a terrible disease arising from the bite of a rabid animal. The animals most liable to be afflicted with madness are dogs; but cats, wolves, foxes and other animals are also subject to it. The treatment of the disease consists in preventing its development, which may be effected by applying a ligature, if possible, above the wound to impede the circulation from the wound; by sucking it, if the membranes of the mouth have no wounds or sores, or by thoroughly cauterizing the wound, either with nitrate of silver or with iron heated to a white heat, the pain of cautery being less as the temperature is greater. If these means are not available, any burning substance and most acids may be used. Promptness of action is always necessary. Pasteur discovered a method of preventing the development of the disease by a system of successive inoculations with virus of greater and greater intensity. Institutes for the care of patients have been established in many of the large cities in the United States and other parts of the world.

Hydrostatic Press or **Hydrau'lic Press**, a machine which operates by the pressure of water and depends upon the principle that liquids transmit pressure equally in all directions. The working of the hydrostatic press is illustrated in the accompanying diagram. The machine consists of two pistons, A and B, fitted with water-tight collars to their respective cylinders, C and D. The piston and cylinder A and D, together with the valves E and F, constitute a force pump, which is connected by a pipe with the cistern M. The piston B is fitted with a platform H, which, when the press acts, is forced upward towards the plate. The object to be pressed, K, is placed upon the platform. The piston A is worked by the handle G, which is so attached as to constitute a lever. The power is applied at P. By working the piston A, water is pumped from M

into the cylinder D and thence into the cylinder C, raising the piston B. If the cylinder A has an area of one square inch and the cylinder B has an area of a hundred square inches, every



pound of pressure applied at A will produce one hundred pounds of pressure upon B. By the lever attachment of the handle G, a pressure of one pound at P will produce a pressure of five hundred pounds upon B.

The hydrostatic press is used in pressing cotton, raising heavy weights and for other purposes where great force is required. See HYDROSTATICS.

Hydrostatics, the science which treats of liquids at rest. Some authorities also include hydraulics under hydrostatics. The laws of hydrostatics are those governing the pressure of liquids, of which water is taken as the type. The most important of these laws are:

(1) Liquids carry pressure equally in all directions. Given, a bottle whose neck will just fit a cork having an area of one square inch. Fill the bottle with water and press down on the cork with a force of one pound; the pressure on the bottle will be equal to as many pounds as there are square inches in its surface. If it has an area of one hundred square inches, the pressure will be one hundred pounds.

(2) The pressure increases with the depth of the liquid. At the surface the pressure is nothing. At the bottom the pressure for any area is equal to the weight of a column of water of the same area extending to the surface. This principle must be taken into consideration in the construction of pipes which are to stand in a vertical position; also, in securing the flow of water for the purpose of turning water wheels, as turbines.

When these two laws are combined, they explain some very curious facts concerning water. It is in accordance with these principles that the water in a small tube will sustain the pressure of that in a large tube, when both are connected

with the same vessel. The water in the spout of the teakettle remains at the same height that it is in the kettle. It is also in accordance with these laws that we account for the great pressure exerted upon tanks, cisterns or boxes that are connected with standpipes which extend to a great height. If an ordinary cask be filled and an upright iron pipe one inch in diameter and thirty feet long be connected with it and also filled with water, the pressure upon the cask is sufficient to burst it.

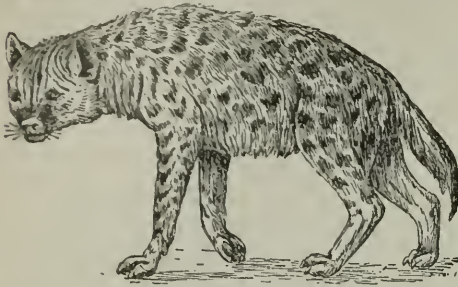
(3) When a body is immersed in a liquid, the pressure upon it is equal to the weight of the liquid displaced. For instance, a cubic foot of water weighs $62\frac{1}{2}$ pounds. If a box having a capacity of a cubic foot and weighing $2\frac{1}{2}$ pounds be immersed in water, it can contain 60 pounds of sand before it will sink.

Hydrosulphuric Acid. See SULPHURETED HYDROGEN.

Hydrotherapy, a method of treating disease by the use of water. Few physicians now think that proper water treatment can be a cure for everything, yet most physicians use it in a great variety of cases. By applying pure hot or cold water it is possible to cleanse exposed tissues, to drive away excess of blood from one part of the body, or to call blood to the place where it is needed. Water affects all secretions of the body in a cleansing and stimulating way. Sprains, sore throat, tonsillitis and other diseases are relieved by compresses of cold or hot water, and fevers are reduced by bathing or by water packs. In this country and Europe are numerous well-appointed institutions where hydropathic treatment can be administered in its most approved form, and these institutions are frequented by patients suffering from the diseases that yield most readily to water treatment. See BATHS AND BATHING.

Hyena, *hi'e'na*, a genus of carnivorous animals, resembling both the cat and the dog, living in Africa and in southern and central Asia. The fore legs are longer than the hind legs, and the animal moves with a swinging, shambling gait. The eyes are large and prominent, the ears are long and acute and the jaws are remarkable for the strength of their muscles. Not only is the animal ugly in appearance, but its odor is sickening and its voice at night resembles a horrible laugh. There are three species known—the *striped hyena* of western Asia, the *spotted hyena*, an African species, yellowish in color with numerous dark spots, and the *brown hyena*, dwelling on African coasts. All are nocturnal animals and

are extremely voracious; they feed chiefly on carrion and are thus of great use in the countries where they live. Along with the true hyenas, the aard-wolf of South Africa is also included in



HYENA

the same family. An extinct species was abundant in England, France and Germany before the glacial epoch and has left its remains in many caves of these countries.

Hygeia, *hi ge'yah*, the Greek goddess of health, daughter of Aesculapius, with whom she was often associated in worship. She was represented as a blooming maid, with a bowl in her hand, from which she fed a snake, the symbol of health.

Hygiene, *hi'jy en* or *hi'jeen*, is that branch of medical science which deals with the preservation of health. While it is founded on medical experience and advanced by medical research, it does not deal with medical or surgical cases. The history of hygiene begins far back in the history of mankind. Among the Jews and the peoples of Assyria and India the priest enforced laws of health in respect to food, isolation of the sick and the removal of waste matter. The length of life of the modern Jew may be due to his following the laws of his forefathers. In Greece the physician enforced the laws of health, which were not so scientific as those of the Jews. The Romans had no laws for protecting the individual. Laws were early made concerning lepers, isolating them and burning their houses. England in 1532 appointed a commission for "the cleaning of rivers, public streams and ditches," but the country was visited by the plague in 1625 and again from 1629 to 1631. In the eighteenth century three persons were conspicuous in connection with the advance of hygiene: John Howard, in his work of cleaning English jails and so greatly reducing the cases of typhus, or jail fever; Captain Cook, in his discovery that scurvy was due to improper food, thus saving the life of many sailors; Lady Mary Wortley Montagu, in introducing the method

of inoculation into England, and so modifying the effects of smallpox (See VACCINATION). Since the eighteenth century, much knowledge as to the causes of disease and its spread has been gained and diffused by the study of climate and its effects, by the use of the microscope, by inquiry into the nature of the different foods and by investigation of the soil under dwellings. These things have led to laws concerning the ventilating of tenements, the cleaning of streets, the inspection of public conveyances, whose dust is the source of many diseases of the throat and lungs, and the sanitary construction of homes, with regard to closets, drains, baths and lavatories.

The individual also has a duty in preventing disease. He must be scrupulously clean in his personal habits; those who have charge of a home must look after the character, quality and quantity of food and its adaptation to the different members of the family, according to age, state of health and occupation; the clothing of beds and persons must be carefully and regularly cleaned and aired; the minds of the young must be directed in the lines that will fit them for the duties of adult life; school rooms must be well lighted and ventilated, and the books must be of such a character that they will not tax the eyes. See ANTITOXIN; BACTERIA AND BACTERIOLOGY; GERM THEORY OF DISEASE; QUARANTINE; SANITARY SCIENCE; SERUM THERAPY; SEWAGE AND SEWERAGE; TUBERCULOSIS; HEATING AND VENTILATION.

Hygrom'eter, an instrument for measuring the amount of moisture in the atmosphere. The hygrometer used by the United States weather bureau consists of a glass tube with a bulb at each end, one of colored glass, or of glass painted black, and the other of plain glass. The colored bulb contains ether and a thermometer; the other is covered with a cap of muslin or with a wick, one end of which dips into a vessel of water. When the instrument is manufactured, the ether is placed in the larger bulb and raised to the boiling point, so as to expel the air from the tube, which is then sealed, leaving a vacuum as the ether cools. The principle upon which this instrument works is that of condensation of moisture in the atmosphere by the lowering of temperature. The water drawn up by the wick which covers one bulb evaporates and reduces the temperature, and this causes the continuous evaporation of ether in the other bulb and so reduces the temperature of this bulb that moisture from the atmosphere gathers upon the glass,

Hyksos

as it does upon a pitcher of ice water. The thermometer in the ether bulb shows the temperature at which this condensation begins to form, while a thermometer on the stand shows the temperature of the atmosphere. By combining the readings of the two thermometers, and by means of tables which have been carefully worked out, the relative amount of moisture can be ascertained.

Hyksos, *hik'soze*, the name given to a dynasty of kings which usurped the power in Egypt about 1700 B. C. See EGYPT, subhead *History*.

Hy'men, the god of marriage in Grecian mythology, usually considered to be the son of Apollo. No marriage took place without his being invoked to sanction it. He is described as having around his brows the flowers of marjoram, in his left hand the flame-colored nuptial veil, in his right the nuptial torch and on his feet golden sandals.

Hy'menop'tera. See INSECTS.

Hymns, NATIONAL. This term is given two distinct meanings. It signifies, first, the popular tunes or songs which are peculiar to a certain people or which are universal among them; second, the hymn or hymns which, by legislative enactment or royal decree or by precedent, are sung or played on ceremonial occasions or at public gatherings. Often the two are the same, but quite as often they are not. True national hymns, that is, those expressing the patriotic sentiments of a people, the outgrowth of their history, form an interesting stage in the development of national music. The steps are, first, folk music; second, national music involving folk music; third, music in praise of rulers or institutions; fourth, patriotic music, the *national hymn*.

The following list gives the specified or accepted national hymns of the various important nations:

Austria, *Gott erhalte unsern Kaiser* (God preserve our Emperor). Music by Haydn; words by Haschka.

Brazil, *Hymn of the Proclamation of the Republic*. Words by Albuquerque; music by Miguez.

France, *La Marseillaise*, by de Lisle.

Germany, *Die Wacht am Rhein*, by Schneckener-burger.

Great Britain, *God Save the King*, probably by Carey.

Greece, *Sons of Greece, Come, Arise*.

Holland, *William of Nassau*.

Italy, Air—*Royal March*, by Gabetti.

Hymns and Hymn Tunes

Japan (translated), *May the Empire Last*.

Mexico, *Mexicans at the Cry of War*, by Nuno.

Norway, *Song for Norway*, by Björnson.

Russia, *God Protect the Czar*. Words by Zhukovsky; music by Lyoff.

Spain, *Himn de Riego*. Music by Herta.

Sweden, *Out of the Swedish Heart*.

United States, *Star Spangled Banner* and *Hail Columbia*.

The following are popular patriotic hymns in the countries named, or are widely used upon patriotic occasions:

United States: *Yankee Doodle*, *Dixie*, *My Country 'Tis of Thee* and *John Brown's Body*.

Germany: *Heil dir im Siegerkranz* (Prussia); *Deutschland über alles*.

See GOD SAVE THE KING; MARSEILLAISE HYMN; STAR SPANGLED BANNER; WACHT AM RHEIN, DIE; YANKEE DOODLE; MY COUNTRY 'TIS OF THEE.

Hymns and Hymn Tunes. A hymn is, in its more general sense, any religious poem, but in its narrower and more common sense it is a religious poem intended to be sung. From the earliest times hymns were used in worship, and the Hebrew *Psalms* constitute a collection of hymns which has never been equaled. In the Christian church there are records that hymns were used as early as the second century A. D., but the first which has come down to us dates from the beginning of the third century. A number of the world's most famous hymns are of Latin origin, but of some of them the authorship cannot be decided. Among these are *Come, Holy Spirit*; *Dies Irae* and the *Stabat Mater* (The Mother Stood).

The Reformation gave a great impulse to the writing of sacred songs, and Luther had a permanent influence on hymn writing, in that he introduced the use of the language of everyday life for hymns. Some of Luther's hymns remain among the best-known hymns of the church, especially *Ein' feste Burg ist unser Gott* (A Mighty Fortress is Our God). Although many hymns were produced in England before the time of Isaac Watts (1674-1748), the name of the "father of English hymnody" is often given to Watts. His hymns are very numerous, and many of them are still exceedingly popular. The only possible rival to Watts in the number of his compositions was Charles Wesley (1707-1788), who wrote over six thousand hymns, almost four hundred of which are still commonly used. Among the later hymn writers in England may be mentioned Cowper, John Henry Newman

and Frances Ridley Havergal; while of American writers may be mentioned Oliver Wendell Holmes, Phoebe Cary, P. P. Bliss, Julia Ward Howe, who wrote the *Battle Hymn of the Republic*; Samuel Francis Smith, author of *America*; Timothy Dwight; Ray Palmer, who wrote *My Faith Looks Up to Thee*, and Frances Jane Crosby, the author of a great number of gospel hymns, of which perhaps the most famous are *Safe in the Arms of Jesus*; *Pass Me Not, O Gentle Savior*, and *Jesus is Calling*. Several hymns which are among the most noteworthy in common use in the churches are *Lead, Kindly Light*, by John Henry Newman; *Nearer, My God, to Thee*, by Mrs. Sarah Flower Adams; *Just as I Am, Without One Plea*, by Charlotte Elliot; *One Sweetly Solemn Thought*, by Phoebe Cary, and *I Love to Steal a While Away*, by Mrs. Phoebe H. Brown.

Previous to the Reformation, the music in use for hymns had been of the nature of chants, or had been heavy and somewhat somber. Luther, however, who had much to do with popularizing the words to hymns in common use, exercised a great influence on the music, also, by adapting certain popular airs and writing sacred words for them. In England the history of hymn tunes begins properly with the eighteenth century. With the music written for the hymns of Charles Wesley, hymn tunes reached, perhaps, their highest point. The character of the music of many of the hymns written in late years has been entirely different from that of the earlier hymns, by reason of its more catchy qualities. The productions of Moody and Sankey represent this type of music, the effect of which on church music in general has not been for the best.

Hypatia, *hi pa'she ah*, (about 355-415), a famous Greek philosopher, of the Eclectic school, the daughter of Theon, a celebrated astronomer and mathematician of Alexandria. Her father taught her not only all the branches of polite learning, but also geometry, astronomy and, finally, philosophy. She acquired a great reputation in the latter study and succeeded her father as lecturer at Alexandria, where she gathered a large number of students from all parts of the East. She was as virtuous and beautiful as she was learned. But the jealousy and intolerance of Cyril, the bishop of Alexandria, were aroused at the influence exercised by Hypatia; the lower and more ignorant clergy in particular were stirred against her, and at length a number of them, having excited a popular tumult, seized her as she was returning from the

schools, dragged her through the streets of Alexandria, stripped her and finally murdered her with circumstances of the greatest barbarity. She is the heroine of Charles Kingsley's *Hypatia*, or *New Foes with an Old Face*.

Hyperbola, *hi pur'bo lah*. See CONIC SECTIONS.

Hye'rión, in the most ancient mythology of Greece, the god of the sun, afterward identified with Apollo.

Hy'permetro'pia, a defect of the eye, caused by a shortening of the diameter extending from front to back, often referred to as flattening of the eyeball. Rays of light entering an eye thus affected are brought to a focus back of the retina, and the person is said to be *far-sighted*. The defect usually increases with age. It is remedied by spectacles having convex lenses. The gradual shortening of this diameter as people grow older necessitates the use of such spectacles in nearly all cases. See EYE; SPECTACLES.

Hypnotism, *hip'no tiz'm*, a condition which may be artificially induced, in which the mind and body of one individual may be peculiarly influenced by another, apparently independently of the subject's will. Such phenomena were known from the earliest time, but Franz Mesmer was the first to use hypnotism as a curative agent. From his name the word mesmerism came to be the common term in use until recent times. Modern scientific investigation, while not fully explaining the phenomena, has shown that they are due to peculiar nervous conditions and that it is unnecessary to presuppose any occult force to account for them. Among the means employed to produce the hypnotic condition are touching and stroking with the hands, breathing on the person and fixing the eyes upon him. It may also, it is said, be produced by causing the patient to stare at an object, especially a bright one, placed in such a position as to strain the eye, the effect being completed by a few passes of the hand over the face without touching it. In the condition thus induced, the patient seems to be in a kind of sleep and the limbs will remain in any position in which they may be placed. By stroking the surface of the body the muscles adjacent may be rendered rigid, as in a person suffering from catalepsy. Reason and memory are temporarily suspended, the will is paralyzed, and the subject is irresistibly impelled to act in accordance with suggestions, however absurd. He can be persuaded into any belief, such as that he is some one other than himself, or that he hears or sees, smells or tastes, something which

is not present before him. As a curative agent, hypnotism has been successfully employed in certain forms of disease, especially in cases of nervous irritation and sleeplessness, diseases that have a nervous origin. The first step toward scientific investigation of hypnotic phenomena was taken by James Braid, an English surgeon, in 1842. To him we owe the term hypnotism. Dr. Heidenhain of Breslau attributes the phenomena to what is known by physiologists as the inhibitory action of the nerves. Such action, he holds, is induced by the process of hypnotizing and has the result of suspending the action of that portion of the brain which is devoted to voluntary movements, thus putting the patient in a condition in which involuntary movements may be induced by impressions made upon the senses. Hypnosis comes, then, not through the power of some person without, but through the action of the subject's own mind. One idea alone is held in mind, and as all the others have been discarded, the subject has nothing with which to compare it and it becomes the ruling power. Not everything concerning hypnotism is understood, but it is certain that no one can be at first forced unwillingly into the hypnotic state, and that only those having considerable mental power can pass into the condition.

Hypodermic, *hi'po dur'mik*, **Injec'tion**, a method of introducing medicine beneath the skin and so directly into the blood. The instrument in use is a small glass syringe, fitted with a long, hollow, needle-shaped point of steel. Hypodermic injections are given when the condition of the stomach or other organs renders the use of drugs by the mouth objectionable, or when rapidity of action is desired.

Hypothesis, a supposition assumed for the sake of argument. In scientific and philosophical usage it denotes either a probable theory of phenomena not yet fully explained, or a strictly scientific theory which accounts for all the

known facts of the case, and which only needs the verification of subsequent observations and deductions to become a certainty. Thus, the conjecture of Newton that the force of gravity, as shown on the earth, might extend to the moon, was in its first stage a probable hypothesis; but when it was found to account for all the facts of gravitation it became a scientific theory.

Hy'rax, a genus of mammals living in southern Asia and southeastern Africa. All the species are small, resembling the rabbit in size and appearance. The *Cape hyrax* is by the colonists of South Africa called *rock badger* and *rock rabbit*, and the common hyrax is also known by the name *coney*. This animal is very cunning and is hard to capture.

Hyssop, *his'sup*, a genus of plants, the common species being a perennial, shrubby plant, rising to the height of two feet. It is a native of Siberia and the mountainous parts of Austria, but it is common in the gardens of the United States. It flowers from June to September. The leaves have an agreeable aromatic odor and a slightly bitter and somewhat warm taste. Hyssop was once esteemed as a medicine, but it has now fallen into disuse. The hyssop of Scripture, the symbol of spiritual purification from sin, is generally identified with the caper.

Hyste'ria, a nervous disease, more common among women than men, but affecting both sexes. It is often spoken of slightly, and formerly it was thought to be entirely under the control of the patient, but it is now known to be frequently a disease of very serious nature, although minor hysterical attacks are common and require little attention. Overwork, worry, shock or vicious habits may be the causes, and any form of great excitement may bring on an attack. The removal of the causes which produce the disease, nourishing food, exercise or massage and complete abstention from worry and anxiety will usually effect a cure.



I, the ninth letter and third vowel of the English alphabet. In its form it has changed considerably from the Phoenician character from which it is derived, and which resembled a Z. The straightening out was gradual. The two principal sounds represented by it in English are the short sound, as in *pin*, and the long, as in *pine*, the latter being really a diphthong, composed of *ah* and *ee*. The other sounds of *i* are that heard in *first*; that heard in *machine*, which can scarcely be considered a modern English sound, though the most common *i* sound in foreign languages; and the consonant sound heard in many words when it precedes a vowel, as in *bullion*. *I* and *j* were formerly regarded as one character.

Ibadan, *e bah'dan*, a town of Western Africa, in the Yoruba country, about 70 mi. n. of the Bight of Benin. Population, estimated at 150,000.

Ibague, *e bah gay'*, a town of South America, in the Republic of Colombia, capital of the Department of Tolima, 60 mi. w. of Bogota. It is located in a valuable agricultural region and is the center of a considerable mining industry. Population, 16,500.

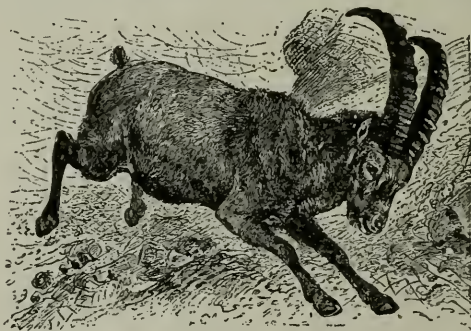
Ibarra, *e bahr'ra*, a town of Ecuador, South America, capital of the Province of Imbabura, at the foot of the volcano of the same name, 30 mi. n. of Quito. Once the town had a population of 16,000, but in 1868 it was almost completely destroyed by an earthquake.

Ibe'ria, the name formerly given to the peninsula comprising Spain and Portugal. It is supposed to have been derived from the river Iberus or the present Ebro. The Iberians are probably the most ancient European nation. They form the basis of the population of Italy, Gaul, Spain and Portugal. The Basques are their descendants and still preserve the ancient Iberian language.

The name was also applied to a fertile district in Asia, between the Black and Caspian seas.

Iberville, *e bair veel'*, PIERRE LE MOYNE, Sieur d' (1661–1706), a French-Canadian soldier and explorer, born in Montreal. He entered the French navy, but returned to America and commanded several exploring expeditions northward and westward into Canada. He took part in King William's War. In 1699 he sailed from France to the Gulf of Mexico, entered the mouth of the Mississippi and established Biloxi, and later Mobile, being thus the founder of the French province of Louisiana.

I'bx, a name of two or three species of wild goats. The horns are flattened and long and



IBEX

have two longitudinal ridges at the sides. The *bouquetin* was once common in the Alps, where it lived high up in the mountains. The *Himalayan ibex* is somewhat larger than the other species and has huge horns. These animals are gregarious and have maintained their numbers in nearly all their native districts.

I'bis, a wading bird, related to the storks, with a long, slender bill curved downward. There are about half a dozen species, of which two or three are found in the United States. The *scarlet ibis* has red plumage throughout, excepting the tips of the wing feathers, which are black. This bird is found in the West Indies, but sometimes comes into the Southern states. The *white ibis*, with black tips to its wing feathers, is common in the Southern Atlantic

and Gulf states. The *sacred ibis* of Egypt is a larger, heavier and less graceful bird. Because it came north with the rise in the Nile and was



SACRED IBIS

an enemy of lizards and small reptiles, it came to be held in great reverence by the Egyptians, who, after its death, preserved it as a mummy. The sacred ibis is now extremely rare.

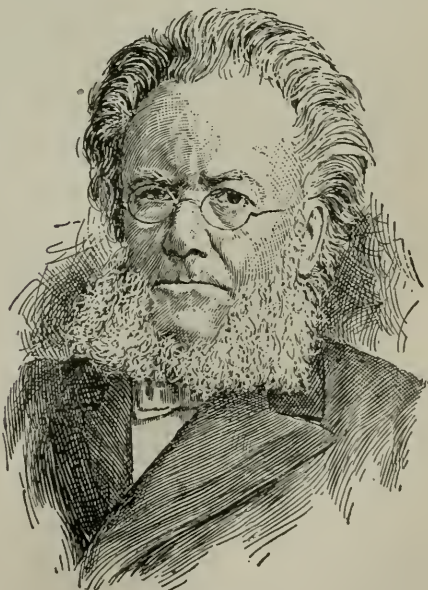
Ibrahim Pasha, *ib rah heem' pa shah'*, (1789-1848), an Egyptian general, the son of Mehemet Ali. He commanded the forces against the Greeks in 1824 and on May 27, 1832, stormed Acre. In the same year he defeated the Turks at Homs and Konieh, and again in 1839 he won a great victory over them at Nisib. In 1848 he succeeded Mehemet Ali as viceroy.

Ib'sen, HENRIK (1828-1906), a Norwegian dramatist and lyric poet. His first play, *Catiline*, was published in 1850, and in the same year *The Warrior's Mound* was successfully produced in Christiania. He was successively director of the theater at Bergen and the Norske Theater at Christiania, which he managed from 1857 to 1862. In 1864 he left his native country, lived for several years in Rome and afterwards in Dresden, but went back to Norway in 1878. His dramas are partly in prose, partly in verse, and they include historical plays and satirical comedies of modern life. Among his chief works are *Brand* and *Peer Gynt*, dramatic poems, *The League of Youth*, *A Doll's House*, *Ghosts*, *Rosmersholm*, *The Lady from the Sea*, *Hedda Gabler*, *Master Builder* *Solness*, *John Gabriel Borkman* and

When We Dead Awaken. The vital character of Ibsen's themes, the fearless presentation of them and his wonderful mastery of dialogue made him the foremost of modern dramatists.

Ib'ycus, a Greek lyric poet of the sixth century B. C. It is related that while on a journey he was surprised and murdered by robbers near Corinth. Finding escape impossible, he declared that the cranes, which happened to be flying over their heads, would avenge his death. When the murderers afterward saw a flock of cranes, one of them cried involuntarily, "Behold the avengers of Ib'ycus." They were in consequence seized, and, after confessing their crime, they were executed. The writings of Ib'ycus are known only by fragments.

Ice, *ise*, water frozen into a solid mass. Water freezes when its temperature is reduced below a certain point, which is by universal consent made a fixed point on thermometers. In the Centigrade and Réaumur scales this point is zero, and in the Fahrenheit scale it is 32° above zero (See THERMOMETER). As water approaches the freezing point in temperature, it contracts, until at about 39° F. it reaches its greatest density. As the temperature lowers it begins to expand, and when it freezes it



HENRIK IBSEN

expands so as to increase its volume about one-ninth. This makes ice lighter than water, so that it floats. The force of the expansion is

very great. This is why pipes, pitchers and other vessels in which water freezes are broken. The breaking of rocks from cliffs is often due to the freezing of water in crevices of rock. A cake of pure ice appears transparent, but when a thin slab of ice is held in water for a few moments to make the sides smooth and is then looked at towards a light, numerous brilliant six-pointed stars are seen. These are some of the six-sided crystals of which the ice is composed.

HARVESTING ICE. The extensive use of ice for preserving perishable substances makes the harvesting, storing and shipping of this article an important industry. Natural ice for use is obtained from the lakes and rivers of cold regions. The first step in harvesting ice consists in scraping off the snow and porous ice from the surface. After this, the field is marked off by a machine called the *marker*. This is drawn by a horse and cuts parallel grooves in the ice about three feet apart; then another set at right angles to the first and about the same distance apart. This marks off the field into cakes. The third step is cutting, which is done by a machine which follows the marker and is of similar construction, except that it has longer knives. After this machine has completed its work, the first cake is cut out by a handsaw. When this has been removed, the others can be split off with a crowbar having a wedge-shaped end. The ice is then hauled from the water to the ice houses, where it is stored until needed. The hauling is done by horses and the placing in ice houses is usually accomplished by means of hoisting engines.

Ice houses are built of wood and in some localities are from two to three hundred feet long and five stories high. They usually have three or four walls, between which spaces of dead air are enclosed, and are provided with drains and ventilators. The ice is packed in sawdust or spent tan bark. The most extensive ice harvesting is on the Hudson River, in Maine and on the lakes and streams of Wisconsin, Michigan and Minnesota.

MANUFACTURE OF ICE. In large cities and in localities far removed from regions where ice forms in winter, it is often cheaper to manufacture ice than to import it. When the ice is intended for domestic purposes it is made from distilled water. The plant for the purpose must contain an engine, pumps, condensers, tanks, pipes and some other machinery. The freezing is done by the expansion of liquid

ammonia into ammonia gas, which takes place in coils of pipe that are surrounded by brine. Since the brine freezes at a much lower temperature than fresh water, by immersing the tanks containing the water to be frozen in brine, the ice is readily formed. The water to be frozen is placed in tanks called *cans*. These are shaped like cakes of natural ice. When these tanks are placed in position the pump forces the ammonia gas into a small chamber under such pressure that it becomes a liquid. This liquid in turn is allowed to escape slowly into the pipes, where it immediately evaporates and absorbs heat from the brine, which is reduced to a temperature several degrees below the freezing point of water. The ammonia is used over and over, so that when the plant has been established the expense of manufacturing ice is comparatively little.

Icebergs, *ice'burgz*, large masses of ice which have become detached from the shores of the Arctic regions, and which float about in the ocean at the mercy of the winds and currents. They are, in fact, pieces of glaciers, detached from the parent mass by the action of the sea and by their own accumulating weight. Icebergs present the strangest and most picturesque forms, are sometimes miles in length and rise to a height of perhaps two hundred fifty or three hundred feet above the sea, the portion above water being calculated as about one-eighth of the whole. Icebergs consist of clear, compact, solid ice, with a bluish-green tint. Their cavities contain fresh water, from the melting of the ice. They are frequently encountered in the North Atlantic and have caused many wrecks. The ice that forms on the surface of the sea, called *field ice*, is porous, incompact and imperfectly transparent. The field ice forms in winter and breaks up in summer. A small field is called a *floe*; one much broken up forms a *pack*. Floes and packs are encountered by navigators in the Arctic Ocean, and icebergs similar to those of the North Atlantic are found in the south polar regions.

Ice Boating. See ICE YACHTING.

Iceland, *ice'land*, an island belonging to Denmark, situated between the North Atlantic and the Arctic Oceans, 250 mi. from Greenland and about 600 mi. w. of Norway. Its greatest length is 300 miles; its central breadth is about 200 miles, and its area, 40,000 square miles. Among the volcanoes the most celebrated is Mount Hecla, in the south, about 5000 feet high.

Numerous hot springs, or *geysers*, are scattered throughout the island, but are found more especially in the southwest, to the northeast of Reykjavik, the capital. There are numerous lakes and rivers. The most valuable mineral product is sulphur, of which the supply appears to be inexhaustible; the other minerals deserving of notice are chalcedonies, rock crystals and the well-known double refracting spar, for which the island has long been famous (See ICELAND SPAR). Vegetation is confined within narrow limits. Almost the only tree is the birch, which has a very stunted growth, the loftiest trees hardly exceeding ten feet. There are various flowering plants, among which saxifrages, sedums and thrift, or sea pink, are common. Among many varieties of mosses and lichens is the edible Iceland moss. But by far the most valuable crop is grass, on which considerable numbers of live stock are fed. The reindeer, though not introduced before 1770, has multiplied greatly and there are large herds in the interior, but they are of little importance economically. Wild fowl, including the eider duck, whose down forms an important article of commerce, are abundant. The streams are well supplied with salmon, and on the coasts valuable fisheries of cod and herring are carried on. Manufactures are entirely domestic and consist chiefly of coarse woolens, mittens and stockings.

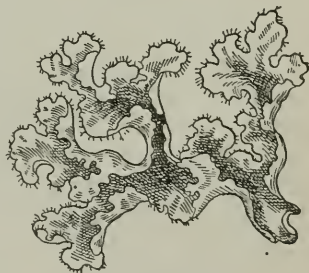
Iceland has a constitution and administration of its own, dating from 1874. There is an Althing, or parliament, which meets twice a year at Reykjavik. It consists of 36 members, of whom 30 are chosen by popular suffrage and 6 are nominated by the king. A minister for Iceland, nominated by the king, is at the head of the administration, but the highest local authority is vested in the governor.

Iceland was discovered by the Norwegians about 860, and in the course of sixty years all the habitable parts of the coast were settled. A permanent government was established, in the form of a sort of aristocratic republic, which lasted for several centuries. Christianity was introduced in 981 and was adopted by law in 1000; and schools and two bishoprics, those of Holar and Skalholt, were established. Previous to this time the Icelanders had discovered Greenland (983) and part of America (about 1000); and they were now led to engage in voyages and travels to Europe and the East. Politically and ecclesiastically the most flourishing period of Iceland—the period, too, when its inter-

course with the world abroad was most active—was from the middle of the twelfth to the beginning of the thirteenth century. In 1264 Magnus VI of Norway united Iceland with his own kingdom, with which it passed to Denmark in 1380, remaining with the latter in 1814, when Norway was joined to Sweden.

The Icelandic language is the oldest of the Scandinavian group of tongues, and as it is believed to exhibit the Norse language nearly as it was spoken at the date of the colonization of Iceland, it is sometimes called *Old Norse*. Iceland possesses a rich literature. Poetry was early cultivated, and among the most important works in Icelandic literature is the collection of ancient heathen songs, called the *Elder*, or *Poetic Edda*. Histories and romantic works, known by the name of *Sagas*, are numerous. Many of these are masterpieces of prose style and are still read with delight by the people of Iceland. Many of the most valuable foreign works have been translated into Icelandic. Population in 1901, 78,470.

Iceland Moss, a species of lichen found in the Arctic regions and on the upper parts of lofty mountains, as, for instance, in Scotland. It is used in medicine, and in Iceland it is an article of diet. When boiled with milk or water it forms a jelly.



ICELAND MOSS

Iceland Spar, the transparent variety of calc spar, a mineral noted for its property of exhibiting in a remarkable degree the double refraction of light. An object seen through it appears double. See POLARIZATION OF LIGHT.

Ice Plant, so named from the transparent vesicles which cover its whole surface and have the appearance of granules of ice. It is a native of South Africa and the Canaries and is also found in Greece.

Ice Yachting, *yacht'ing*, a sport almost peculiar to America, though it is occasionally indulged in near Saint Petersburg in Russia. It first made its appearance in the United States late in the eighteenth century and since that time has steadily increased in popularity, until now it is commonly seen on lakes in the northern states during the winter months. The most

common type of ice yacht consists of a triangular box mounted upon two crossbars, the lengthwise bar being from one-third to one-half longer than the crossbar. On both ends of the crossbar are fastened steel skates, and at the rear of the longer bar is a skate which is under the control of a lever and serves as a rudder. The boat has one large sail and often a smaller jib sail. In racing, a triangular course of about one mile on a side is laid out, and the contestants are compelled to sail five times around this triangle in each heat. Under favorable weather conditions and on good ice, remarkable time can be made, since in certain directions the boat can move considerably faster than the wind that propels it. From 40 to 70 miles an hour is not an unusual speed. The principal points at which ice yachting tournaments are held are on the Hudson River, at Poughkeepsie and Newburgh; Lake Minnetonka, near Minneapolis, Minn.; Lake Winnebago, near Oshkosh, Wis.; at Burlington, Vt., on Lake Champlain; on the Saint Lawrence River, and on Lake Ontario.

Ichneumon, *ik nu'mon*, a genus of carnivorous animals belonging to the civet family. They have a long, slender body, a sharp and pointed muzzle and short legs. The most celebrated species inhabits Egypt, where it is called *Pharaoh's rat*. It was held sacred by the ancient Egyptians on account of its hostility to crocodiles, whose eggs it digs out of the sand and sucks. It is expert in seizing serpents by the neck so as to avoid any injury to itself. The ichneumon is domesticated in Egypt, and is more useful than a cat in destroying rats and mice. The *Mongoose*, or *Indian Ichneumon*, is another species, not so large as the Egyptian, which it resembles in habits. It is kept in many families as a useful domestic animal. It is especially famous for its ability to kill the deadly cobra.

Ichneumon Flies, a large family of insects, all of which agree in one particular, that they deposit their eggs either in or on the bodies, eggs or larvae of other insects. These apparently insignificant creatures confer inestimable benefits on man, as they destroy hosts of insects injurious to crops. They are delicate, long-legged insects, varying much in size. They are armed with ovipositors of various forms.

Ichnology, *ik nol'o jy*, the name applied to the modern study of fossil footprints or other impressions on rocks. The impressions are almost always found on rocks that have been

deposited as mud. They abound in the New Red Sandstone, but are not common to other sandstone formations.

Ichthyology, *ik'thy ol'o jy*, that branch of zoölogy which treats of fishes. See **FISHES**.

Ichthyosaurus, *ik'thy o saw'rus*, an immense fossil marine reptile. The members of this genus had four broad feet, or paddles, each enclosed in a single sheath or integument, and a long and powerful tail. Their bodies were round and tapering, the heads large, with long snouts and short necks. The vertebrae of these animals very closely resembled in shape those of a fish. Some of the largest of them must have exceeded thirty feet in length. Their remains show that they existed in large numbers in some parts of Europe. In all about thirty-five species are known, skeletons of which have been found in the formations of the East Indies, Australia, New Zealand, South America and Europe.

Iconoclasts, image breakers, the party in the early Christian church that would not tolerate images, much less the adoration of them. At first, images of martyrs and bishops were placed in the churches merely to keep their memory fresh, but latterly (in the sixth century), they began to be worshiped, lights being burned before them and incense offered in their honor. The Eastern emperor Leo III issued an edict in 726, ordering the people to abstain from the worship of such images, and soon after he decreed their destruction. This caused great commotion, and there arose two parties in the church, the image worshipers and the *Iconoclasts*, or image breakers, who each in turn persecuted the other. In 754 a council at Constantinople condemned image worship; in 787 the second council of Nice (Nicaea) asserted and defined the doctrine. The controversy lasted over a century, coming to an end when, under the empress Theodora, a council held at Constantinople (842) declared in favor of the worship of images among the Greeks, a decision which was confirmed by a second council, held in 869 and 870, in the same place. In the Western Empire, also, images were at first retained only to preserve the memory of pious men, but the decision of the pope, which allowed the worship of images, finally prevailed in the Western Church.

Ic'terus. See **JAUNDICE**.

Icti'nus, an ancient Greek architect, in the Age of Pericles, chief architect of the Parthenon at Athens and of other important buildings.

I'da, in ancient geography: 1. A mountain range in Asia Minor, at the foot of which lay the city of Troy. Its highest peak is Gargarus, 5750 feet. 2. The middle and highest summit of the mountain chain that divides the island of Crete from east to west. This peak affords a fine prospect and is covered with woods of pine, maple and cedar.

I'daho, the GEM OF THE MOUNTAINS, one of the Northwestern states, is bounded on the n. by British Columbia and Montana, on the e. by Montana and Wyoming, on the s. by Utah and Nevada and on the w. by Washington and Oregon. Its extreme length from north to south is 485 miles. The northern boundary is about 45 miles long, and the southern boundary has a length of about 300 miles; the area is 84,800 square miles, 510 square miles of which is water. Population, in 1900, 161,772, of which 4226 were indians.



IDAHO

1, Boise; 2, Pocatello; 3, Lewiston.
Dotted lines indicate chief railroads.

SURFACE AND DRAINAGE. The greater part of the eastern boundary is formed by the principal range of the Rocky Mountains, or their extensions, the Bitter Root and Coeur d'Alène. In the Bitter Root section these mountains attain their greatest altitude, and all along the range there are many peaks whose summits are above the line of perpetual snow. Extending across the state from east to west in an

irregular direction are spurs of the Salmon River Mountains and the Saw Tooth Range, which divide the state into two districts, the southern, which comprises the basin of the Snake River, and the northern, which is drained by the Salmon, the Clark and other tributaries of the Snake and Columbia. The basin of the Snake River is less mountainous than the rest of the state, and large portions of it are comparatively level; but the southeastern counties contain spurs of the Rocky Mountains and other ranges, some of which extend into Wyoming and others into Utah. The northern portion of the state is exceedingly mountainous and consists of mountain ranges with deep intervening valleys, through many of which streams flow. In the northern county of Kootenay are found depressions containing a number of lakes. Chief among these are Lake Pend Oreille, Lake Coeur d'Alène and Lake Priest.

The southeastern county is drained by Bear River and the Great Salt Lake. With this exception the entire state is drained into the Columbia River, either through its great tributary, the Snake, or through the Clark and other smaller streams of the north. The Salmon River waters the central part of the state and flows in an irregular course north, west and thence north again, until it joins the Snake on the western boundary of the state. The Clark drains Lake Pend Oreille and the northern part of the state, while between these and the Salmon River are a number of smaller streams of comparatively little importance.

CLIMATE. The southern part of the state has an average elevation of about 2500 feet, but the mountainous regions have a much higher elevation, some sections reaching over 10,000 feet, while the average elevation is about 4500. This variation in altitude gives a variety of temperature in different sections which would otherwise have the same mean temperature. In the southern part of the state, during July and August, the thermometer may rise as high as 100°, but the winters are mild, the temperature seldom falling below freezing point, and there is but little snow. In the mountains the winters are severe and the snowfall is heavy, but the mountain valleys are sufficiently sheltered to allow stock to roam at large during the winter, in many sections without feeding. The southern half of the state has little rainfall, and agriculture can be practiced only through irrigation, but in the northern part of the state there is an abundance of rain, caused by the

contact of the western winds with the high mountain ranges. Here there is sufficient moisture for agriculture, and the snows upon the mountains supply the streams with water throughout the year. On the whole, the climate is temperate, free from extremes and very healthful.

MINERAL RESOURCES. Idaho abounds in minerals, and mining is the most important industry. The value of the mineral output is nearly \$23,000,000 each year. This is divided among gold, silver, lead, copper, coal and a few minerals of less importance. In the northern part of the state is located the famous Coeur d'Alène mine, one of the richest gold, silver and lead mines in the country. Gold has been mined in the southern and southwestern counties since 1862. Originally much of this mining was from the beds of streams, but these have now been exhausted and the gold is obtained from veins. The mountains in the central part of the state and on the western boundary have been prospected and reveal many rich deposits which it is still impracticable to open, because of the lack of transportation facilities.

AGRICULTURE. Agriculture is the second industry in importance, and wherever there is sufficient moisture, cultivation of the soil yields rich returns, as the soil is very fertile. In the valley of the Snake River there is not sufficient rainfall, and only irrigated land can be cultivated. This land, however, is well suited to irrigation, and over 700,000 acres are now under tillage. The reclamation project of the United States government, when completed, will add to this over 800,000 acres. The chief crops are wheat, oats and barley, among the cereals, and in the irrigated districts and sheltered valleys a great deal of fruit, consisting of apples, prunes, pears, strawberries and other small fruits, is grown. Sugar beets are also raised with profit, and this branch of agricultural industry is assuming greater importance each year. Alfalfa and clover are largely grown for hay and pasturage.

Idaho is well adapted to grazing and contains between 25,000,000 and 30,000,000 acres of pasture lands. Stock raising is, therefore, an important branch of agriculture, and the state contains a large number of sheep, cattle, horses and mules. The dry lands of the Snake River valley afford suitable pasturage for many of these animals through the winter months, but during the summer they seek the green herbage of the mountain regions, where there is plenty of water. Idaho is one of the leading states of

the Union in raising sheep and in the production of wool.

MANUFACTURES. As in other new states, the manufactures are less important than mining and agriculture, but they are making rapid progress. The state contains over 20,000,000 acres of white pine and other valuable timber trees, and the central counties are considered to have the largest virgin white pine forests in the world. Much of this timber is yet beyond reach, because of lack of transportation facilities; nevertheless, there are sufficient forest areas along streams and near railroads to make lumbering the leading manufacturing industry of the state. The manufacture of flour and other grist-mill products is also important, while the remaining industries are of such nature as meet the demands of other trades and occupations.

TRANSPORTATION AND COMMERCE. The streams are so rapid that they cannot be successfully navigated; besides, many of them contain falls at frequent intervals. The southern part of the state is crossed by the Union Pacific and the Oregon Short Line, the northern part by the Great Northern railway, while the Northern Pacific extends across the state from Wallace to Harrison, on Lake Coeur d'Alène, passing through Washington. There are a few spurs extending from these trunk lines to various localities, but the great central part of the state is yet without railway communication, though good carriage roads and stage lines supply all settlements with mail at regular intervals.

The commerce of the state consists in the exportation of gold, silver, lead and other mineral products, lumber, wool, beef and hides, while the imports are largely manufactured products and such foodstuffs as are not grown with profit. Much of the export trade is with the states to the west, the products finding an outlet through Seattle and other Pacific ports.

GOVERNMENT. The legislative department consists of a senate and a house of representatives. Members of each are chosen at a general election for two years, and the legislature meets biennially. The executive department consists of the governor, a lieutenant governor, a secretary of state, a state auditor, a state treasurer, an attorney-general and a superintendent of public instruction, each elected for a term of two years by popular vote. The judicial department consists of a state supreme court, district courts, probate courts and justice courts. The supreme court has three judges, who are elected by the people for a term of six years. The state is divided

into six judicial districts for the administration of justice through the district courts, and each of these is presided over by a district judge.

EDUCATION. Idaho has a school system patterned after the most modern plan. The public schools are under charge of a superintendent of public instruction, and the schools of each county are under the immediate charge of a county superintendent. Each of these officials is elected by popular vote. The support of the schools is derived from the income from a state fund; from the school fund, obtained from the sale of the sixteenth and thirty-sixth sections of land in each township, and from local taxation. The state university at Moscow is at the head of the public school system. This maintains departments of letters and sciences and has affiliated with it the college of agriculture and an agricultural experiment station and also the Academy of Idaho, a secondary school located at Pocatello and deriving its support largely from a land grant. There are state normal schools at Lewiston and Albion, which devote their attention entirely to the training of teachers for the public schools. There are also a number of colleges and secondary schools supported by churches of different denominations.

INSTITUTIONS. The state penal institutions consist of the penitentiary, located at Boise, and the industrial and reform school, at Saint Anthony, which is designed for juvenile offenders of both sexes. The charitable institutions comprise the asylum for the insane at Blackfoot, and the soldiers' home, located near Boise.

CITIES. The important cities in the state are Boise, the capital; Pocatello; Moscow, and Lewiston, each of which is described under its title.

HISTORY. The first white men to visit Idaho were Lewis and Clark, who made explorations there in 1805-1806. Not until 1852, when gold was discovered, did actual settlers come. Ten years later a territory was organized which included Idaho and most of Wyoming and Montana. Within the next five years, Idaho was reduced almost to its present boundaries. Between this time and the admission of Idaho as a state, July 3, 1890, the people of the territory were concerned chiefly with a campaign against the Mormons, who practiced polygamy; with difficulties between union and non-union miners, and with the development of the great resources of the state. Since its admission, Idaho has steadily prospered and increased in population.

Idaho, UNIVERSITY OF, a state university, established at Moscow in 1892. It is supported by the state, and tuition is free to all except non-residents. The government is in the hands of a board of regents. The courses offered are classical collegiate, scientific, civil and mining engineering, and agriculture. The number of students is about 350; the annual income from state appropriation, \$6000.

Idealism, *i dee'a liz'm*, in philosophy, a theory that sensible or material objects do not exist outside of consciousness. Idealism makes the spiritual part of man the original and only true existence. The original theory has received various modifications by different philosophers. One of the most recent of these considers that the world of experience is dependent upon a conscious subject, that is, man in a conscious state and working in accordance with the laws of thought; but at the same time it denies that ultimate reality is dependent upon such action. In all its forms idealism is opposed to realism. See **REALISM**.

Ides, *idez*, with the Romans, the fifteenth day of March, May, July and October and the thirteenth of other months.

Id'iom, the name given to certain words or phrases which, though in common usage in a language, do not admit of grammatical analysis. The same term is often applied to the various dialects or forms of a language.

Id'iot, a person who, from original defect, is almost destitute of intelligence, or in whom the intellect seems to be almost wholly wanting. In some cases the intellectual development is so low that there appears to be little more than a vegetative life. Others, not quite so low in the intellectual scale, recognize the persons with whom they live, are capable of being affected by certain emotions, understand a few questions, articulate a few words and are able to take their own food, but are quite unable to do any kind of work. Those endowed with a little more intelligence may sometimes be employed in the simplest forms of labor, but they are incapable of performing any intricate calculation or going through any long train of reasoning. The brain of an idiot is sometimes sufficiently regular in its conformation, although in the great majority of cases there is something abnormal. The forehead is often depressed, receding and flattened; sometimes the back part of the head is disproportionately large. The majority of idiots are of small stature and of weak constitution, rarely living beyond 40 years.

The causes of idiocy are not well known. See FEEBLE-MINDED, EDUCATION OF.

I'dol, an image of a deity, used as an object of worship, such worship constituting idolatry. The early nations "bowed down to idols of wood and stone," and even the Jews under the influence of Babylon made for themselves graven images to such an extent that their prophets had to protest against all forms of idolatry, though there were images of the cherubim in the Holy of Holies. Christianity helped to do away with such expressions of reverence, and the Koran forbade the making of an image of any living thing, whether it was intended to be worshiped or not. Zoroaster did not believe in or recommend idols. Images were introduced by the early Church, as is shown in the cups used in administering the Lord's Supper. The chapels in the catacombs contain on their walls many representations of sacred things. In the fifth century, statues of Christ, of the Virgin Mary and of many of the saints were used in both public and private worship. Today, images serve as incentives to devotion, rather than as objects of worship, but they are unknown in any of the wholly Protestant communions.

Idol'atry, the worship of an image, object or symbol, as having in itself some divine and supernatural power and being able in some way to respond to the worship paid it. Idols consist of images, usually representing some deity or person, but idolatry may also consist in the worship of natural objects to which divine powers are ascribed, such as the sun and animals. Some consider idolatry to be a falling away from the worship of the true God and see in the various forms of heathen worship only a degraded form of original revelation. Others believe that idolatry is the result of an inborn desire to search after the true God and consider it the first stage of human development along religious lines. There are many forms of idolatry, and it characterizes some of the great religions of the world. See BUDDHISM; BRAHMANISM.

Idun, *e'doon*, a goddess in the Scandinavian mythology, the wife of Bragi and the keeper of the apples of which the gods ate to keep themselves young.

Idyl (from the Greek word meaning *little image*), the name usually applied to a short and highly finished descriptive poem, especially one which treats of pastoral subjects. This last circumstance, however, is not an essential characteristic of the idyl. All that is necessary

to constitute a poem of this class is that it present to view a complete picture in small compass.

Ignatieff, *ig nah'tyef*, NIKOLAI PAVLOVITCH (1832-), a Russian soldier and diplomatist. He served in the Crimean War and was made a colonel in 1856. In 1858 he was sent on a special mission to Bokhara and Khiva and afterward went as ambassador to Peking. He was appointed minister at Constantinople in 1864, and he remained in Turkey through the troublous times prior to the Russo-Turkish War. The intrigues to which he resorted for advancing Russian influence in Turkey and weakening the Turkish Empire won for him the title of "Liar Pasha." He was conspicuous in the negotiations before and after the Russo-Turkish War and was appointed minister of the interior, but was dismissed in 1882. Subsequently he was made governor general of Irkutsk.

Ignatius, *ig na'she us*, SAINT, bishop of Antioch, one of the apostolic fathers, said to have been a disciple of the apostle John. His life and death are wrapped in fable. According to the most trustworthy tradition, he was appointed bishop of Antioch in 69 A. D. and was thrown to wild beasts in the circus of Antioch by the command of Trajan, the date being given by some as 107, by others as 116 A. D.

Ignatius of Loyola. See LOYOLA, IGNATIUS OF.

Igneous Rocks, in geology, those rocks which were originally formed by the action of heat, having been cooled from a molten condition, such as lava, basalt and granite. Igneous rocks have not stratified and may occur in connection with sedimentary rocks of any age, since they have been forced out of their original position by later upheavals in the earth's surface.

Ignis Fatuus (foolish fire), a luminous appearance, seen floating over marshy places at night, and sometimes, it is said, in churchyards. It is probably due to some gaseous mixture, capable of igniting spontaneously, but it has never been satisfactorily explained. Other names are *Will-o'-the-wisp* and *Jack-o'-lantern*.

Igorrote, *e'gor ro'tay*, a tribe or race inhabiting several islands of the Philippines.

Iguana, *ig wah'na*, a genus of lizards, natives of Brazil, Guiana and neighboring localities. The iguana has an average length of about four feet. Its food consists almost entirely of fruits, fungi and other vegetable substances. Along the whole length of the back to the tip of the tail

there is a crest of elevated, compressed, pointed scales. The toes are furnished with sharp claws, which enable it to climb trees with ease, while a rapid serpentine movement of its tail propels it swiftly through the water. Its usual color is dark olive green. Its flesh is considered



IGUANA

a delicacy, being very tender and in flavor resembling that of a chicken. One species, the *alligator lizard*, is found in the United States as far north as Indiana. Certain species are valuable to farmers as destroyers of insects and harmful worms.

Iguanodon, *ig wahn'o don*, an extinct fossil lizard, found in Europe; so called from the resemblance of its teeth to those of the iguana. The head was large and narrow, and the jaws were heavy, provided with strong, horny beaks like those of the turtle. The teeth were large and broad, implanted in sockets and transversely ridged. The pelvic bones were strikingly like those of birds. The skin does not seem to have possessed the spines or bony plates of allied species. The iguanodon was an herbivorous animal that walked on its hind legs, in the manner of kangaroos. It was from fifteen to twenty-five feet long. Great numbers of the animals were formerly found in the swampy regions of England and Belgium.

Ik Marvel, *ike mahr'vel*. See MITCHELL, DONALD GRANT.

Il'eus or **Il'iac Passion**, the last stage of the severest form of colic. Acute pain, frequent vomiting and hiccough are the chief symptoms. The suffering is often produced by some mechanical obstruction of the bowels, which only a surgical operation can remove. The disease is often fatal.

Il'iad, the greatest of ancient epics, ascribed to the Greek poet Homer. It is in twenty-four books and describes the events of about forty days in the ten years' siege of Troy by the Greeks. In order to understand the *Iliad*, the facts leading

up to it, some of which are mentioned in the poem, must be known. The Trojan Paris had carried off Helen, wife of Menelaus, king of Sparta, and the most beautiful woman in Greece. She had been promised to him by the goddess Venus as a reward for his having decided in favor of Venus the contest of beauty between Venus, Minerva and Juno. To recover Helen and avenge the wrong, the Greeks, under command of Agamemnon, king of Mycenae and brother of Menelaus, had set sail to besiege Troy. Ten years they besieged the city without result, for the Trojans would not venture forth to combat, on account of their dread of the famous hero Achilles. Finally, Achilles suffered insult from Agamemnon, who took from him the captive maiden, Briseis, who had been assigned to him after the sack of a small outlying town. Achilles left the conflict and withdrew to his tent by the seashore. This is the point at which the *Iliad* begins, and much of the poem is devoted to the wrath of Achilles, its causes, effects and the manner in which it was appeased. The Trojans, secure in the absence of Achilles, came forth to meet the Greeks, and fifteen of the twenty-four books tell the varying fortunes of the conflict. Finally, Patroclus, the friend and kinsman of Achilles, begs Achilles to lend him his armor, and with it he goes into battle. The Trojans believe they see Achilles and flee in terror, but at length Patroclus is afflicted with a stupor by Apollo and is slain by Hector. To avenge his friend, Achilles returns to the combat, with a new suit of armor given him by Vulcan. He slays Hector and drags his body to the ships. In the last book King Priam begs of Achilles his son's body, and during a truce Hector is buried with fitting rites. The struggle is participated in by the gods throughout the poem, Mars and Apollo aiding the Trojans, Juno, Minerva and the other deities sustaining the Greeks. Several famous single combats occur, as between Paris and Menelaus, Hector and Ajax, Aeneas and Achilles. See HOMER and the names of the principal persons mentioned above.

Il'ion. See Troy.

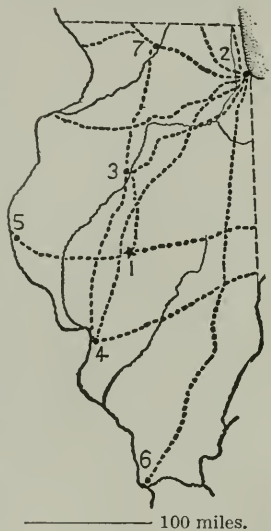
Iliion, N. Y., a village in Herkimer co., 12 mi. s. e. of Utica, on the Mohawk River and the Erie Canal and on the New York Central and the West Shore railroads. It is in an agricultural region and has manufactories of firearms, typewriters, bicycles, knit goods, filing cases and other articles. The place was settled about 1816 and was incorporated in 1852. Population in 1905, 5924.

Ilum. See TROY.

Illimani, *cel'ye mah'ne*, one of the loftiest peaks in the Bolivian Andes, fully 21,000 feet high. It is covered with glaciers. On it is Lake Illimani, about 16,000 feet above sea level.

Illinois, *il li noy'* or *il li noiz'*, the PRAIRIE STATE, one of the central states, bounded on the n. by Wisconsin, on the e. by Lake Michigan and Indiana, on the s. e. by Kentucky, from which it is separated by the Ohio River, and on the w. by Missouri and Iowa, from which it is separated by the Mississippi River. The Wabash River also forms the southern portion of the boundary between the state and Indiana. The greatest length of the state from north to south is 378 miles, and its greatest breadth from east to west is 210 miles. The area is 56,650 square miles, of which 650 square miles are water. Population in 1900, 4,821,550, of which 86,677 were colored.

SURFACE AND DRAINAGE. Illinois is one of the most level states in the Union. As a whole, its surface may be considered as a great plain, sloping gently from the northern boundary toward the south. The highest land is in the north and northwest, and on the northeastern corner there is a small section sloping toward Lake Michigan. This area belongs to the Saint Lawrence basin and was formerly a portion of the bed of the lake. With this exception the entire state belongs to the Mississippi basin. The northern portion of the state is composed largely of rolling prairie, with bluffs along the streams; these hills in some of the western counties are quite high. The central portion of the state contains vast tracts of level land, whose surface has little variation except here and there where bluffs occur. A spur of the Ozark Mountains crosses the southern portion of the state from east to west and contains numerous hills having an altitude of from 1200 to 1400 feet above sea



ILLINOIS
1, Springfield; 2, Chicago;
3, Peoria; 4, East Saint Louis;
5, Quincy; 6, Cairo; 7, Rock-
ford.
Dotted lines indicate chief
railroads.

level. These hills, or mountains, as they are locally termed, rise abruptly in their northern slope, but descend to the level of the Ohio more gradually. In consequence of this feature the ten southern counties are more diversified in surface than any other portion of the state. Much of this region is covered with hardwood forests.

The important rivers in the state are the Rock, crossing the northwestern portion; the Fox, draining into the Illinois, and the Desplaines and Kankakee, which unite to form the Illinois, the largest stream within the state. From its formation this river flows westerly and southwesterly until it enters the Mississippi, about 20 miles above the confluence of that stream and the Missouri. The Illinois flows in a deep channel which it has worn, and it is bordered by fairly high bluffs. It is navigable as far as Utica. The principal streams in the central and southern parts of the state are the Sangamon, an important tributary of the Illinois; the Kaskaskia, which flows nearly across the state in a south-southwest direction and joins the Illinois, and the Big Muddy, joining the Mississippi. On the east are the Embarras, the Little Wabash and the Saline, flowing into the Wabash. The streams flowing into the Ohio are unimportant.

In the northeastern corner of the state are Fox and Grass lakes and a few other smaller bodies of water. There are also lakes in Mason, Lawrence, Monroe, Jackson and Massac counties, but they are small and of little importance. Peoria Lake is formed by the expansion of the Illinois River.

CLIMATE. The extent from north to south causes considerable difference in the climate of the extreme sections. That of the southern counties averages 11 degrees warmer than that of the northern counties. The entire state is subject to sudden and excessive changes in temperature, but extremes of heat and cold are of short duration. The climate is in most localities healthful. The average annual rainfall is 38 inches. It is heavier in the south than in the north, but the character of the soil in the north more than compensates for the deficiency.

MINERAL RESOURCES. The mineral resources of Illinois are of great value and place her among the most important of the mining states. The most valuable mineral is coal. A line drawn from Rock Island through the northern boundary of Grundy County practically separates the coal-bearing from the non-coal-bearing area. Nearly all the state to the south of this line is underlaid with coal measures. The area of the Illinois

Illinois

coal measures is about 42,000 square miles. From three to five veins are found in all the measures, and these vary in thickness from a few inches to nine feet. The veins lie from 300 to 1200 feet below the surface, though but few mines have been worked beyond a depth of 500 feet. The annual output is over 36,000,000 tons, making Illinois second only to Pennsylvania as a coal producing state. There is quite an extensive deposit of petroleum in Clark and Crawford counties, in the southeastern part of the state. Though only a small portion of the field had been exploited in 1906; in 1908 Illinois was the second state in the production of petroleum. Galena, a lead ore, is mined in the extreme northwestern section of the state. Tile and brick clay of excellent quality occur in many localities, and building stone is found in Will, Kane, Cook, Kankakee, Henderson, Hancock, Adams and Union counties.

AGRICULTURE. With but few exceptions the soil of the entire state is remarkably fertile and easily tilled. The broad expanse of prairie and the deep, rich soil, free from stones, make the use of agricultural machinery profitable. The most improved methods of tillage are practiced in the best farming sections, and Illinois is one of the foremost states in the extent and value of her agricultural products. The wide climatic range of the state admits of a great variety of crops. Corn is the leading crop; the annual planting usually exceeds 10,000,000 acres, and the annual production is between 350,000,000 and 400,000,000 bushels, making this the second state in the Union in the growing of this important crop. Large quantities of oats are raised; then follow wheat, potatoes, barley and rye, though the last two are not as extensively grown as the other cereals. Nearly all sections of the state are adapted to fruit, and in the northern and central portions apples, cherries and pears are raised, while south of the center peaches, plums, strawberries, apples and small fruits are grown in large quantities. This is particularly true of the counties south of the Ozark Mountains, where both soil and climate are admirably adapted to this industry.

The raising of corn and the ease with which hay can be procured, together with the presence of extensive tracts suitable for grazing, make Illinois an ideal state for the raising of live stock, and large numbers of cattle and hogs are fattened for the market each year. In addition to this, horses are raised throughout the state, and an extensive dairy business is conducted in the northern half. That portion of the state within

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easy shipping distance of Chicago carries on a thriving dairy industry, in producing milk for the city.

MANUFACTURES. Notwithstanding its adaptability to agriculture, Illinois is the third state in the Union in the extent and importance of its manufactures, being exceeded only by New York and Pennsylvania. The reasons for this position of Illinois as a manufacturing state are the abundance of cheap fuel furnished by her coal deposits and the unusual facilities for transportation afforded by Lake Michigan and the numerous railway lines centering in Chicago. About 70 per cent of the manufactures of the state are produced in and about Chicago. The most important of all these industries is slaughtering and meat packing (See MEAT PACKING). Next in order are the manufacture of agricultural implements, iron and steel products, clothing, malt and distilled liquors, flour and grist mill products and printing and publishing. The great iron and steel mills are located principally at South Chicago and Joliet. The ore manufactured into iron at these mills is brought from the Minnesota and Michigan mines by boat as far as Chicago, and the Joliet mills obtain their portion thence by rail. Besides these cities the important manufacturing centers are Peoria, which has the largest distilleries in the United States; Aurora; Elgin, noted especially for its manufacture of watches; Moline, containing extensive factories for the manufacture of agricultural implements; Jacksonville, Rockford, Dixon and Bloomington.

TRANSPORTATION. Illinois contains over 11,600 miles of railways, a larger mileage than has any other state. The principal city, Chicago, is the greatest railroad center in the world. The most important lines traversing the state are the Illinois Central; the Chicago & Alton; the Chicago, Milwaukee & Saint Paul; the Chicago & Northwestern; the Chicago, Burlington & Quincy; the Atchison, Topeka & Santa Fé; the Big Four; the Chicago, Rock Island & Pacific, and the Wabash. Many other important trunk lines from the East terminate in Chicago. The state is so well supplied with railways that every town is within easy access of one or more lines. An extensive lake traffic is carried on from Chicago, which is the largest inland port in the world. Cairo, East Saint Louis and Alton are important river ports. The Illinois & Michigan Canal connects Lake Michigan with the Illinois River at Utica, and another canal, to connect the lake with the Mississippi at Rock Island, is in

process of construction. The Chicago Drainage Canal will probably become a ship canal. See DRAINAGE CANAL, CHICAGO.

GOVERNMENT. The legislative department consists of a senate and a house of representatives. The state is divided into 51 senatorial districts, each of which is entitled to one senator and three representatives. The senators are chosen at popular election for a term of four years, but the districts are so classified that the terms of one-half of the senate expire every two years. The members of the house of representatives are chosen for two years, and the statute contains a peculiar provision by which the voter may cast three votes for one representative, one vote for each of three representatives or one and one-half votes for each of two representatives. The executive department consists of the governor, the lieutenant governor, the treasurer, the secretary of state, the auditor, the attorney-general and the superintendent of public instruction, each of whom is chosen at popular election for a term of four years, with the exception of the treasurer, whose term is two years and who is not eligible for reelection. The superintendent of public instruction is elected in the middle of the term for which the governor and other state officers are chosen. At the head of the judicial system is the state supreme court, comprising the judges of the seven judicial districts into which the state is divided, the judges being elected for nine years. The judges of these districts choose one of their number as chief justice. Below the supreme court are appellate courts, circuit courts and county courts, and the larger counties have probate courts. At the bottom of the judicial system are the justice courts, which have jurisdiction over petty cases. The local government is administered through county and township officers.

EDUCATION. The state maintains an excellent system of public schools on the district plan, with provision for township high schools in all towns which elect to maintain such institutions. The University of Illinois is at the head of the school system of the state, though it is not officially affiliated with the high schools. The school fund is about \$18,000,000, and the support for schools is derived from interest on this, from fines and forfeitures, from an annual assessment of \$1,000,000 upon the taxable property of the state and by local taxation. The annual expense of the public schools is about \$22,000,000, and the number of pupils enrolled is about 550,000. State normal schools are maintained at Normal,

Carbondale, DeKalb, Charleston and Macomb. The important universities, not connected with the public school system, are the University of Chicago, and Northwestern University at Evanston and Chicago. Besides these there are numerous smaller colleges and secondary schools, supported by various denominations and widely distributed over the state. Some of the most important of these are the Armour Institute at Chicago, Lake Forest University at Lake Forest, McKendry College at Lebanon, Illinois College at Jacksonville, Wesleyan University at Bloomington, Knox College at Galesburg, Augustana College at Rock Island and Monticello Seminary (for young ladies) at Godfrey.

INSTITUTIONS. Schools for the deaf and dumb and blind are maintained at Jacksonville; the institute for feeble-minded is at Lincoln; the state penitentiaries are at Joliet and Chester; the state reformatory is at Pontiac, and the hospitals for the insane are at Jacksonville, Anna, Kankakee, Elgin and Watertown. There is a soldiers' and sailors' home at Quincy and a soldiers' orphans' home at Bloomington; there is also a United States soldiers' home at Danville.

CITIES. The important cities are Springfield, the capital; Chicago, Peoria, Quincy, Rockford, East Saint Louis, Joliet, Aurora, Bloomington, Elgin, Decatur, Rock Island, Evanston, Moline and Freeport, each of which is described under its title.

HISTORY. Marquette and Joliet were the first white men to visit Illinois, crossing it by way of the Illinois River in 1673. In 1680 La Salle built Fort Crevecoeur (the broken heart) near Peoria, and in 1682 Fort Saint Louis was erected on Starved Rock. Settlements sprang up at various points, the first being at Kaskaskia, about 1700. In 1763 the territory came into possession of the English. During the American Revolution, Col. George Rogers Clark captured the British posts on the Mississippi and at Vincennes, Ind., and by the treaty of 1783, Illinois was ceded to the United States and in 1787 became a part of the Northwest Territory. It was organized as a separate territory in 1809, with the capital at Kaskaskia; the famous massacre occurred at Fort Dearborn in 1812, and Illinois was admitted into the Union in 1818. In 1832 the indian troubles culminated in the Black Hawk War, which resulted in the final removal of the indians from the state. The Illinois and Michigan Canal was projected in 1837 and was completed in 1848. Trouble arose

with the Mormons, who had settled at Nauvoo, in 1840, and in 1844 they removed to Utah. In 1850 Congress granted lands for the construction of the Illinois Central Railroad, which contributed much to the prosperity of the state. Illinois was the scene of a bitter slavery struggle, but freedom prevailed. The state contributed six regiments of troops to the Mexican War, and nearly 250,000 men to the Union army during the Civil War. The great debates between Douglas and Lincoln, rival candidates for the Senate, occurred in 1858. The chief events since the Civil War are the Chicago fire (1871), the anarchist riot (1886), the World's Columbian Exposition at Chicago (1893) and the riots consequent upon the railroad strike in 1894. Illinois has had three constitutions; the first was adopted in 1818, the second in 1848 and the third in 1870. There have been likewise three capitals, Kaskaskia, Vandalia and Springfield. Since the Civil War the state has been almost uniformly Republican in politics. Consult Mather's *The Making of Illinois*; Mason's *Chapters from Illinois History*.

Illinois (men), a group of indian tribes that once occupied the present State of Illinois. La Salle in his explorations met the indians, and he and his followers secured to the French the friendship and assistance of the Illinois. After the War of 1812 these indians caused the United States much trouble, but finally they were subdued, and now only about 200 remain, on a reservation in Oklahoma.

Illinois, UNIVERSITY OF, a state university, situated at Urbana. It was founded in 1867 and was incorporated as the Illinois Industrial University. In 1885 the name was changed to the University of Illinois. In 1887 it was made co-educational, and about one-sixth of its students now are women. It maintains undergraduate departments in literature and arts, engineering, science and agriculture, and corresponding graduate courses are also given. In addition to the university proper, there is a state library, a school of music, a college of law, a college of medicine, with a department of dentistry and a school of pharmacy. The United States Agricultural Experiment Station is also connected with the university and is located at Urbana. The medical school and school of pharmacy are located in Chicago. The faculty in all departments numbers about 400, and there are about 4000 students. The library contains 75,000 volumes, and in addition to this, there are several department libraries at the disposal of the university for the

purpose of reference. The annual income from state appropriations is \$780,000.

Illinois and Michigan Canal, a boat canal connecting Lake Michigan, at Chicago, with the Illinois River, at LaSalle, Ill. It is ninety-six miles long, sixty feet wide at the bottom and six feet deep, and it has seventeen locks, each one hundred ten feet long and ninety-eight feet wide. It was begun in 1836 and was completed in 1848. By means of this canal, boats can pass from Lake Michigan to the Gulf of Mexico. When first constructed the Illinois and Michigan Canal was an important waterway, but owing to the construction of railways, it is now little used. See CANAL.

Illinois River, a river in Illinois, formed by the union of the Kankakee and the Des Plaines, in the northeast part of the state. It flows southwest and falls into the Mississippi about 20 miles above the mouth of the Missouri. It is 500 miles long, half of it being navigable. An expansion in the river forms Peoria Lake. Ottawa and Peoria are on its banks. A canal connects the river with Chicago.

Illiteracy, *il lit'ur a sy*, the name given to the condition of a person who can neither read nor write. The percentage of illiterates in a population depends largely upon the educational facilities and regulations within the country, those countries having the smallest percentage which have the most stringent laws regarding compulsory education. The following list includes the important nations of the world, in the inverse order of the percentage of illiteracy:

PER CENT.		PER CENT.	
Germany	0.11	Ireland	17.00
Switzerland.....	0.30	Austria.....	23.80
Scotland.....	3.57	Hungary.....	28.10
Holland	4.00	Greece.....	30.00
France	4.90	Italy.....	38.30
England.....	5.80	Russia	61.70
United States....	10.70	Spain	68.10
Belgium.....	12.80	Portugal.....	79.00

Illyricum, the ancient name of a country which bordered the coast on the northeastern part of Italy and extended eastward into Macedonia. The eastern portion is now occupied by Albania. The inhabitants, styled Illyrians, were famous pirates in the days of the Romans. This brought them into conflict with the Roman government, and the country was captured and made a Roman province. Under this rule the territory embraced what is now known as Croatia, Dalmatia, Herzegovina and Montenegro. After the fall of the Roman Empire the region was subject to many political changes

In 1809 it came under the control of the French, but when this Empire was dissolved, the Illyrian provinces were united to the Austrian Empire. That portion including Albania now belongs to Turkey.

Iloilo, *lo'lo lo'lo*, the capital of a province of the same name in the Philippines, situated on the island of Panay, on the southeastern coast. Among the prominent buildings are a cathedral, a seminary and the buildings used by the government. It is second only to Manila in importance as a commercial center and has an excellent harbor. Its chief exports are sugar, tobacco, rice, coffee and dyewoods. Population, 19,054.

Image Worship, *im'aj wur'ship*. See IDOLATRY; ICONOCLASTS.

Imaginary Quantity, in mathematics, in the most general sense, a quantity whose relations can only be expressed, but not determined, by mathematical symbols and processes. The only important example is the indicated square root of a negative quantity, as $\sqrt{-1}$. Since the square of both negative and positive real quantities are positive, obviously no negative quantity can have a real square root; but in higher mathematics, expressions for such quantities are constantly produced, and for want of a better name they are called imaginary quantities.

Imagination, *im a'jin a'shun*, the power of reproducing mental images in a modified form. Imagination and memory are so intimately associated that some authorities include both under the reproductive powers of the mind. Memory, however, is confined to reproducing images as they occur, while imagination has no such restrictions, and its range is as wide as the powers of the intellect can extend. These powers are sometimes contrasted thus: Memory reproduces images as they were; imagination reproduces them as we wish them to be. The first act in constructing images of the imagination is that of *dissociation*. We cannot recombine the elements of ideas into new images until we first separate them from the ideas in which they originally occurred. One cannot join the human head to the body of a horse until he first dissociates it from the human form.

PHASES OF THE IMAGINATION. There are three phases of the imagination, the modifying, the mechanical and the constructive. The *modifying phase* is common to all children and is used in reproducing images in modified form, as seen in the child's ideas of giants and fairies. Because this phase of the imagination is so

active at this period of life, fairy tales are of especial interest to children. The modifying phase, in which objects are enlarged or made smaller, is later followed by the imitative phase, in which the child seeks to reproduce the various actions, tones of voice and other characteristics of those with whom he associates. During this period many of the habits of speech and action which last through life are formed.

The Mechanical Phase. In the exercise of this phase of the imagination, parts of objects are joined in such a way as to show no proper relation between them, as in the joining of the head and shoulders of a man to the body of a horse, or the bust of a woman to the tail of a fish. The literature of mythology abounds in illustrations of this sort.

The Constructive Phase. This is the most important phase of the imagination, and its activity gives rise to a great variety of products which influence our lives. It differs from the mechanical phase in fitting together the elements which it contains, as in the construction of a machine, which must first be produced in the imagination of the inventor. All the parts are carefully molded and fitted, so that when put together they form a structure which works to a given end. One of the most common uses of this phase of the imagination is in the construction of images from the verbal descriptions of others, as the construction of images of countries and cities which one has never seen, either from listening to a verbal description or from reading. However, in order that correct images may be constructed in this way, it is necessary that the person have in mind the ideas embodied in the description.

Another important use of this phase of the imagination is in the invention and construction of tools, machines and the numerous articles in daily use. It is also employed by every artisan in connection with his work. Every stroke of the blacksmith's hammer, the carpenter's plane or the seamstress's needle is guided by the imagination. It is due to this power of the mind that such wonderful structures as the Brooklyn Bridge, the Eiffel Tower and the great buildings of the Louisiana Purchase Exposition were produced. It is also this phase of the imagination which leads to the construction of the great works of art and literature. In these fields its products are more nearly perfect than in others, because it is not subject to so many limitations of material. The constructive imagination causes us to establish ideals, and because of

this it is an important factor in the building of character. It also has much to do with one's happiness. One is usually cheerful or melancholy, according to the imaginary pictures of the future which he constructs. Worry consists in employing the imagination in picturing magnified evil results of a certain line of conduct or a definite act. In this case the image is much stronger than the reality.

CULTIVATION OF THE IMAGINATION. Imagination is one of the most important powers of the mind, but in order that the greatest benefit may be derived from it, careful training is necessary. Those in charge of children can greatly assist in the training of this power by observing the following principles:

(1) The imagination is a practical power and is associated with every act of perception. Without its use a child cannot gain correct ideas of objects. When looking at a ball or a cube, one imagines the shape of the portion of the object which he cannot see.

(2) The imagination has abundant material from which to construct its images. It is impossible to put into the images ideas that are not already in the mind. One cannot imagine an iceberg or a gorilla if he has no idea of these objects.

(3) Fairy tales, myths and fables are particularly suited to young children, because they harmonize so perfectly with the phase of the imagination that is most active during that period of life.

(4) The imitative stage of imagination is strong during the first years of a child's school life and can often be used in such a way as to make the work of the school pleasant and profitable.

(5) The plays of children are actuated by the imagination, and when of the right sort they serve an important purpose in giving strength and culture to this power.

(6) Reading, language, geography and history afford excellent opportunity for giving culture to the constructive phase of the imagination, but in order that the desired results may be obtained, both teachers and parents should see that the subject-matter is thoroughly understood; otherwise, correct images will not be formed.

(7) Within the limits of their capacity, children should be encouraged to exercise the constructive phase of their imagination in invention and creation. They should be led to give as much life as possible to their recitations and

exercises in school and to their work and play at home.

(8) A full development of all the senses is essential to the formation of correct images. This should never be overlooked. See PERCEPTION; SENSATION.

(9) The imagination exerts a strong influence upon the physical condition of young children; consequently, only such subjects should be presented in primary grades as will lead to a happy frame of mind and to the enjoyment of healthful exercise.

(10) The imagination is the power by which ideals are formed. The nature of these ideals will depend upon environment and instruction. Through appeals to the imagination, more than to any other power, children can be led to form right character.

(11) Ideals are progressive, and one gradually leads to another. The wise mother and teacher will see that the ideals presented to children under their charge are constantly and gradually progressing towards higher and nobler types.

See PSYCHOLOGY; MEMORY; FEELING; HABIT. Consult Halleck's *Education of the Central Nervous System* and *Psychology and Psychic Culture*, Sully's *Outlines of Psychology*, Compayre's *Lectures on Pedagogy* and Salisbury's *The Theory of Teaching*.

Imam, *e mahm'*, a class of Mohammedan priests. In Turkey they attend to the mosques, call the people to prayer from the minarets and perform other duties. In ecclesiastical affairs they are independent and are not subject to the supreme priest, or mufti. They may quit their office and reënter the lay order. The sultan, as chief of all ecclesiastical affairs, has the title of *imam*.

Immigra'tion, the removal of inhabitants from one country or state to another for the purpose of residence, viewed from the standpoint of the country to which they go. The same phenomenon, considered from the standpoint of the country which they leave, is *emigration*. The causes of such removal are as various as human motives and temptations; but among the important ones are over-population, industrial and economic depression, religious or political oppression, the spirit of adventure, the desire for fame and fortune. In barbarous times a tribe, having exhausted the tract on which it had established itself, naturally migrated to more tempting territory. In Greece, the limited territories of the states ren-

Inclination

incense in worship, but the practice cannot be shown to have existed among Christians till after the first four centuries. Among the Catholics it is used at every high mass, at consecrations of churches, in processions and at funerals.

Inclination, MAGNETIC. See DIPPING NEEDLE.

Inclined Plane, a device used for raising heavy weights, as when a barrel of flour is loaded onto a wagon by being rolled over a plank, one end of which rests upon the wagon and the other on the ground. There are many practical applications of the inclined plane, one of the most common being the winding of a road around a hill, so as to avoid steep grades. The law of equilibrium of the inclined plane is that the power multiplied by the length of the plane equals the weight raised multiplied by the height.

Incombustible Cloth, cloth which cannot be burned. The fabric is rendered fireproof by steeping it in solutions such as sulphur of ammonia, borax, alum or sal ammoniac. This cloth is used in the manufacture of heat apparatus and in making firemen's clothing and curtains and scenery for theaters.

Income Tax, a tax levied directly upon incomes of every description, whether derived from land, capital or industry. An income tax was imposed in the United States as a war measure in 1862 and was repealed in 1871. A subsequent statute in 1895 was declared unconstitutional by the Supreme Court. The income tax forms a prominent feature of the fiscal system of England. The rate is progressive, that is, it increases with the size of the income. In theory the income tax is the most perfect tax known, since it most nearly meets the requirement of being assessed according to ability to pay. In practice it is difficult to secure favorable results, since it is hard to prevent the shifting of the tax.

In'cuba'tor, in poultry raising, a machine for the artificial hatching of eggs. An incubator consists of a chamber, in which an even temperature can be maintained and in which the eggs are placed. Heat is usually supplied by a lamp, and the chamber may be warmed directly by air or by water which surrounds it. It has an arrangement for ventilation and also for supplying the atmosphere with the necessary amount of moisture. The perfect incubator allows the eggs to be hatched under as many natural conditions as it is possible to secure. During the first few days of incubation the eggs are frequently turned, but during the last days they are not disturbed, and the incubator is not opened

Independent Treasury

until the eggs are all hatched and the chicks are dried. The best results are obtained by maintaining an even temperature of about 100° during incubation.

In'cubus, a spirit or demon to whom was formerly ascribed the oppression known by the name of *nightmare*. These demons play a somewhat important part in the superstition of the Middle Ages.

Independence, KAN., the county-seat of Montgomery co., 85 mi. s. w. of Fort Scott, on the Verdigris River and on the Atchison, Topeka & Santa Fé and the Missouri Pacific railroads. Natural gas and oil wells are numerous near the city, and it has been growing very rapidly, having more than doubled in population in five years. There are cotton, flour, paper, sugar and planing mills, and the manufactures include crackers, glass, vitrified brick and other articles. The city has a considerable trade with the surrounding agricultural region and contains a public library and a fine courthouse. Population in 1900, 4851, and in 1905, 11,206.

Independence, Mo., the county-seat of Jackson co., 10 mi. e. of Kansas City, on the Chicago & Alton, the Missouri Pacific and other railroads. The city is a popular residence suburb of Kansas City. It contains several manufactories and is the seat of the Saint Mary's Academy. The place was settled in 1827 and was chartered as a city in 1889. Some Mormons settled here in 1831, but they removed to Illinois in 1838. During the years 1849 and 1850 Independence was quite a gathering place for the emigrants to California, and from here two of the great trails led westward. During the Civil War it was the scene of several minor engagements. Population in 1900, 6974.

Independence, DECLARATION OF. See DECLARATION OF INDEPENDENCE.

Independence Day, a name given to the legal holiday of July 4 in the United States, the anniversary of the signing of the Declaration of Independence.

Independence Hall, a brick building in Chestnut Street, Philadelphia, erected between 1729 and 1734 as a meeting hall. Later it was turned into an office building, but during the Revolutionary War it was the meeting place of the Continental Congress. The Declaration of Independence was signed there, July 4, 1776. The building is now used as a museum of historical relics.

Independent Treasury, a name given to the method of regulating United States money,

adopted by the United States in 1846. It was the result of a long contest over the expediency of establishing a United States Bank, and it was passed in the hope that the treasury would be completely divorced from banks, in order that the privilege which the banks received and the influence which they wielded under the former system might be abolished. The new scheme provided for the deposit of United States funds in the treasury at Washington and in certain sub-treasuries in the principal cities. The principle of complete independence from banking, however, has not been fully carried out, since the government, at times when money is scarce, has always deposited funds with the banks, in order to put money in circulation and to reduce the treasury's surplus.

Index Expurgatorius is a catalogue of books which Roman Catholics are prohibited from reading. The prohibition is based on the authorship, subject-matter, or both, and is either absolute or partial, the latter lasting till the book is made satisfactory. The works of Calvin, of Luther and of any founder of a heresy are absolutely forbidden. Books of an immoral character, books relating to magic and any book that would tend to weaken the faith of a Catholic are placed in the Index. The latest edition is that of Leo XIII, 1895. The work of condemning is done by the Congregation of the Index, composed of examiners, consultants, cardinals and a prelate, who is always a cardinal. Their action is controlled by the pope.

India, a British possession of southern Asia, lying between 8° 5' and 20° 55' north latitude and 62° and 100° east longitude, bounded on the n. by Afghanistan and the Chinese Empire, on the e. by the Chinese Empire, Siam and the Bay of Bengal, on the s. by the Indian Ocean, and on the w. by the Arabian Sea and Persia. Between India and the Chinese Empire on the north are two small independent states, Nepal and Bhutan. The greatest extent from east to west, including Baluchistan, is about 2000 miles, and from north to south, 2000 miles. The area of the British Indian Empire, which includes Baluchistan, Burma and the native states, is 1,766,642 square miles, or about one-half that of the United States, including Alaska. The peninsula has a regular coast line of about 3000 miles, with only two prominent indentations on the western side, the Gulf of Cambay and the Gulf of Cutch; while the Pambam Channel separates the island of Ceylon from the mainland. The term *India* is used in two

senses. In the first it is applied to the empire of India, which includes the British possessions of South Central Asia. In the second it is restricted to the great peninsula between the Bay of Bengal and the Arabian Sea and the country immediately north of it, extending as far as the Himalaya and Karakorum Mountains, a little beyond the 36th parallel of north latitude. This article treats of India proper. For the remaining countries, see BALUCHISTAN; BURMA.

SURFACE AND DRAINAGE. The surface of India is divided into three regions, the mountainous region of the Himalayas in the north; the great plain of the Ganges and Indus, adjoining this region, and the table-land of Deccan, which forms the larger part of the peninsula, with its surrounding lowlands on the coast. The mountainous region contains the loftiest peaks and passes of the Himalayas and descends by long, steep slopes to the Ganges valley (See HIMALAYA). The valley of the Ganges and Brahmaputra is generally broad, low and quite level, the lower part of it being inundated during a portion of the year. The southern slope rises gradually to meet the plateau of Deccan. Between the valley of the Ganges and that of the Indus there is a height of land, which consists of a low swell, extending in an irregular line from the Gulf of Cutch northeastward to the mountains. The table-land of Deccan occupies the space between two coast ranges of mountains, known, respectively, as the Eastern Ghats and the Western Ghats, and is bounded on the north by the Vindhya Mountains. Its altitude varies from 1400 to 3000 feet, and on its surface are found numerous conical peaks, that rise from 1000 to 2000 feet above the table-land. This table-land is divided by the Nerbudda and Kistna rivers into north and south sections. The general slope of the region is toward the east, and most of the surface is covered with a fertile soil.

The great rivers of India are the Indus, with its tributaries, the Sutlej and the Chenab, in the northwest; the Ganges, with its tributary, the Jumna, and the Brahmaputra in the north and east, and the Godavari, the Kistna and the Nerbudda in the central and southern part of the peninsula. Of these, only the Indus empties into the Arabian Sea.

CLIMATE. The climate of India has a wide range, owing to the extent of latitude and the various elevations of the different portions of the country. In the south and central portions and along the coast the temperature is high throughout the year, but in the elevated regions

in the interior, as the highest portions of the Deccan, and especially among the mountains in the north, the climate is salubrious, so that these regions afford relief to Europeans and others, who dwell in the lowlands during the cooler season and retire to the mountains for the hot period. The rainfall is extremely varied. To the north, along the Bay of Bengal, in the province of Assam, it is from 500 to 600 inches a year, and in extraordinary seasons it has been known to exceed this amount. This region receives the heaviest rainfall in the world. In the extreme northwestern portion of the country the rainfall is light, and there is a region, extending northward from the Gulf of Cutch for nearly 500 miles, in which rain scarcely ever falls. The annual precipitation at Calcutta is about 66 inches, at Bombay, 75 inches, and at Madras, 52 inches. The arid regions, in which famine is frequent, are in the upper regions of Bengal provinces, in the north central portion of the country.

MINERAL RESOURCES. Explorations show that there are extensive deposits of coal, also considerable copper, iron and lead in India proper. Small quantities of silver and gold ore have been found in some sections, and there are some precious stones. The diamond, which was formerly obtained in India in considerable quantities, is now seldom found. Coal is the only mineral extensively mined, and it is produced for the purpose of supplying the railways. Other mining interests have not been developed.

AGRICULTURE. The country has a great variety of vegetation. The slopes of the Himalayas below the tree line are covered with timber, valuable for many purposes. The lowlands, especially around the mouths of the great rivers, contain extensive swamps filled with rank vegetation and harboring many fierce wild animals. Trees of various species are scattered throughout the country, though, except on the mountain sides, there are no extensive forests. The most useful trees are blackwood, sandal, teak, various kinds of cedar and some species of palm and oak. Bamboo is also a valuable product.

Agriculture is the leading occupation of the country and engages the attention of a large part of the inhabitants. The people who till the land live in villages, which may consist of a few houses or of several thousand inhabitants. The land is near the village, and each occupant tills a comparatively small area. The native inhabitants are opposed to the introduction of agricultural machinery and of implements such as

are used in Europe and the United States; consequently, the methods employed are primitive and the results are far less than they might be with better methods of tillage. Nevertheless, the soil is fertile, and where supplied with sufficient moisture it yields good crops. In some sections of the interior irrigation is regularly practiced, and in others it is used when the rainfall is less than the average. The government has, at the expense of large sums, constructed reservoirs in these localities, for the purpose of reserving the surplus of water to be used as needed. The most important crops are rice, wheat and other cereals, cotton, sugar, indigo, opium, jute, tobacco and tea. The northwest provinces raise the largest quantity of wheat, and cotton is grown most extensively in the central portion of the peninsula, while sugar cane is most extensively cultivated in Bengal and the United Province. Indigo is an important product in the lowlands of Bengal, tea is cultivated in Assam and Lower Bengal and opium is restricted to the region around Benares and is a government monopoly. Oil seeds also constitute an important crop in several localities.

MANUFACTURES. Ever since India has been known to civilization, the native inhabitants have been famed for their skill in the manufacture of textile fabrics remarkable for their fineness and delicacy. Many of these are made wholly by hand labor and with the simplest of implements. Among them are the products of the Province of Kashmir. Rugs and carpets peculiar to this country are also produced in large numbers. Within recent years, however, modern machinery and factories have been introduced for the manufacture of cotton goods, and this has resulted in the production of large quantities of a coarse, cheap fabric, which has an extensive sale and forms an important article of export. Other products peculiar to India are furniture and articles of beautifully carved woodwork. There is also some metal work in gold and silver of similar nature. Because of the skill used in their manufacture and their beauty of appearance, all articles of this sort command a high price in European markets. Manufactures of jute and hemp are also important, and the extension of commerce with western countries has increased the outputs of woollens, paper, flour and lumber, while in some localities there are breweries and in others indigo and sugar factories.

TRANSPORTATION. The large rivers, the Ganges, the Brahmaputra and the Indus, admit

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of navigation for a good portion of their length, but smaller streams, particularly in the mountainous regions, are too rapid for successful navigation, even by small boats. Since the occupation of the country by the British government, railways have been constructed between all of the important cities and into the districts which are liable to be affected by famine. The government was actuated in this work largely by a desire to relieve the famine-stricken districts, by providing means of transporting supplies whenever they were needed. Numerous cross-lines have also been constructed, so that now India is well supplied with railways, there being about 27,565 miles in operation in December, 1904. Much of this is under control of the government, but some systems are leased to private corporations. Canals connecting some rivers have also been constructed, so that, with the exception of the mountainous regions in the interior, all sections have reasonably good transportation facilities.

COMMERCE. The commerce of India is among the most important of all Asiatic countries. The principal exports are cotton, rice, jute, opium, tea, coffee, indigo, raw wool, wheat, oils, silks, chemicals, drugs, textiles and other articles peculiar to the manufactures of the country. The imports consist of foodstuffs, machinery and manufactured articles of great variety, especially those that can be obtained from western markets more conveniently and cheaply than they can be produced in the country. A great part of the trade is with Great Britain. Germany, France, the United States and Egypt are also important countries in the foreign commerce; Japan is the most important of the Asiatic nations in this respect.

INHABITANTS AND LANGUAGE. The country is densely populated and includes a variety of nationalities and communities. The original inhabitants were probably a race of dark complexion and short stature. These people were in the distant past conquered by an invading race from the northwest, who were of lighter complexion and fair skin. This invading tribe called themselves *Arya*, and it is from them that the term *Aryan* is obtained. They dispossessed the native inhabitants of their dwellings along the coasts and valleys and drove them into the hills. The Aryans thus became the possessors of the country, and a large part of the population, including about three-fourths, generally known as Hindus, are descendants from this people and are considered the native race, while all others

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are considered foreigners. However, the Aryans by intermarriage with other races have greatly changed in appearance since their invasion, and the descendants of pure Aryan stock are now found only in the upper Ganges valley and on the northwestern coast of the peninsula. Following the Aryan invasion at some distance was another by the Scythians, who have also left their stamp upon the northwestern part of the country, while the northeastern region, the valley of the Brahmaputra, contains a large element from the Mongolian nations to the north and east. There are also a few Jews, some Persians and a small number of Europeans in the country.

India has a great variety of languages. In the northern part of the country the dialects are of the Indo-European branch of languages and are closely allied to the Sanskrit. Most important of these are the Hindi, spoken by about 87,000,000 people, and the Bengali, spoken by about 45,000,000. In the northwest the dialect known as the Punjabi, which is a modern Hindu dialect, prevails, while what is known as Hindustani, the most generally used language, is a modified form of Hindi, which contains Persian, Arabic, Turkish and Dravidian words. From the central part of the peninsula south, languages belonging to an entirely different family are in general use.

The prevailing religions are Brahmanism, which is embraced by the largest portion of the inhabitants, or about 207,000,000; Mohammedanism, numbering about 62,500,000 followers; Buddhism, numbering about 9,500,000, and spirit worship, with about 8,500,000 followers. There are about 3,000,000 Christians and smaller numbers of various other sects. The prevalence of Brahmanism, which is based upon caste, has fastened its social system upon the country so strongly that it forms a great barrier to any progress or change in industrial or social organization. See BRAHMANISM.

The government has established schools of higher grade and made provision for elementary instruction in many parts of the country, but owing to the religious objection to education in these schools, only comparatively few children and youth obtain advantages from them. There are universities at Calcutta, Madras, Bombay and other cities, and numerous colleges are scattered throughout the Indian Empire. Missionary societies from America, England and other countries also maintain schools of a high order, in which children of Christian families are educated.

GOVERNMENT. In government, India is a Crown colony (See GREAT BRITAIN, subhead *Government*, division *Colonies*). The officer at the head of the government is the secretary of state for India, who is a member of the British cabinet and is assisted by a council. The executive officer of the government is the governor-general, usually styled the viceroy, who is appointed by the Crown for a term of six years, and who has his residence in Calcutta. He is assisted by a council, which by the addition of members may be enlarged into a legislative body. In the addition of members for legislative purposes, a portion of the council must consist of natives of the country. The presidencies of Madras and Bombay are governed by a governor appointed by the Crown, but the other political divisions are administered by a lieutenant governor or high commissioner, who is appointed by the governor-general. With the exception of important questions pertaining to foreign affairs, the governor-general is free to use his judgment in the administration of the Empire. Local government varies according to conditions. India contains many native states which are ruled by their native rulers subject to the sanction of the governor-general, and some of them are required to maintain a military force which can be called into the service of the Empire any time it is desired. Local government is almost entirely in the hands of the natives, who choose the officers for stated periods. The object of the home government is to place the responsibility for the maintenance of local authority in the hands of the inhabitants, as far as possible.

CITIES. India is a country of rural population, and notwithstanding its large number of inhabitants, the number of great cities is comparatively small. Of these the most important are Calcutta, the capital; Madras and Bombay, the great commercial ports; Delhi, Benares, Hyderabad, Lucknow, Rangoon and Lahore, each of which is described under its title.

HISTORY. The early history of India is obscurely written in the myths of Sanskrit literature. The first fact of any certainty is that about the year 2000 B. C., or even earlier, an Aryan people of comparatively high civilization descended from the mountain regions of the northwest into the plains of India and subdued the original inhabitants there. The expedition of Alexander the Great to the Indus gives a momentary glimpse of that part of India, but between his invasion and the Mohammedan

conquest, there is little authentic history. In the third century B. C. Buddhism was established throughout India, but it afterwards gave way almost entirely to Brahmanism. In 1001 A. D. the sultan Mahmud of Ghazni invaded India, and the Mohammedan power was gradually established throughout the country. Late in the fourteenth century Timur, or Tamerlane, led a great Mongol invasion and proclaimed himself emperor of India. He shortly retired, however, to Central Asia, and it was not until 1526 that the Mogul Empire in India was really founded under Sultan Baber, a descendant of Tamerlane. The Mogul Empire began to decline after the death of Aurungzebe in 1707, and about thirty years later Nadir Shah of Persia invaded India and sacked Delhi (See AURUNGZEBE). Throughout the Empire, which had been firmly held together under the great Moguls, the viceroys under the weaker emperors began to declare themselves independent.

The breaking up of this strong Empire offered a good opening to European nations, and the Venetians, Portuguese and Dutch, who had been visiting India from the fifteenth century, began to make their influence strongly felt. The English East India Company had formed commercial settlements in India as early as 1613, and from the first there was a rivalry between them and the French settlements, which had also been established early in the seventeenth century. The first real conflict with the French did not take place, however, until 1746, when the English lost Madras, which was, however, restored to them by the Treaty of Aix-la-Chapelle.

From the time of Clive (See CLIVE, ROBERT), the English held the dominant influence in India, and 1757, the year in which Clive defeated the Moguls at Plassy, is the date of the foundation of the British Empire in India. The strong government set up by Clive was preserved under Warren Hastings, who, by the appointment of English officers to collect the revenues and preside in the courts, laid the foundations of the present system of British administration in India. In 1774 Hastings was made first governor-general of India (See HASTINGS, WARREN). In 1778 the intrigues of the Bombay government led to the first war with the Mahrattas, and in this the British arms were saved from disgrace only by the achievements of the Bengal army which Hastings sent to the aid of the Bombay presidency.

In 1838 the first Afghan War was undertaken,

the object of which was to set up a native province as a northern guard to British India. The war terminated in disaster for the British, but later in the same year a second campaign was undertaken, which proved more successful. In 1857, shortly after the appointment of Canning to the governor-generalship, the Sepoy Mutiny occurred. Several outbreaks among the Sepoys took place during March, 1857, but the most formidable revolt was at Meerut, on May 10, when the Sepoys rose and massacred the Europeans. They then fled to Delhi, where they were immediately joined by the native garrison, and another massacre took place. The revolt spread rapidly in the northwestern provinces, from Oudh down to Lower Bengal. In the Punjab the prompt measures of the government officials in disarming the Sepoys prevented an outbreak, and the Sikh population continued steadily loyal. Wherever the mutiny broke out, it was attended with savage excesses. At Cawnpore the revolting Sepoys were headed by Nana Sahib, the heir of the last peshwa of the Mahrattas. The Europeans, after a heroic attempt to defend themselves, capitulated on the sworn promise of Nana Sahib that he would allow them to retire unmolested; but as they were embarking, they were set upon and indiscriminately massacred. The women and children were carried back to Cawnpore and kept until July 15, when they were all put to death on the approach of Havelock's army. Havelock took Cawnpore by storm on the following day. At Lucknow Sir Henry Lawrence was besieged in the residency and, despite Lawrence's death, the place was held until Havelock relieved it in September. He himself was in turn besieged and was with difficulty relieved by Sir Colin Campbell (See CAMPBELL, SIR COLIN, Lord Clyde). By May, 1858, order had been partially restored, and the mutiny was at an end.

In 1858, as a result of this mutiny, the sovereignty of India and the powers of government hitherto vested in the East India Company were transferred to the British Crown. The Empire was consolidated by the viceroys who followed, and in 1877 the queen of England was proclaimed empress of India. In the following year occurred an Afghan war with Shere Ali (See SHERE ALI), but peace was finally established, and Abdurrahman Khan was placed on the Afghan throne by British arms. In 1897 another serious outbreak on the Afghan frontier occurred, but the British at length were completely victorious. A severe famine in 1899

affected millions of people throughout the country, and there were some attempted revolts, but on the whole the country proved loyal.

The determination of England to treat Tibet as an independent power, which was to remain neutral territory between the dominions of Russia and Great Britain, led to constant friction with Russia. The government of India in 1903 invited Tibet to send representatives to a conference for the settlement of various misunderstandings, and when the request was refused an expedition under Colonel Younghusband was dispatched into the country. After a difficult march and some severe fighting, the force reached and took Lhasa. The grand lama fled, a new ruler was appointed who was more favorable to British interests and a treaty was made which secured important commercial concessions to the English. Russia objected on the ground that England was establishing a virtual protectorate over Tibet, but the English government steadily maintained that its object was to secure the commercial rights of India and not to annex Tibet. Population in 1901, 294,361,056.

Consult Lindsay's *India, Past and Present*; Frazer's *British Rule in India*, and Scott's *In Famine Land*.

India Ink, an indelible, true black ink, without shade of any other color. It is manufactured in China and in India. The Chinese make it from soot, which they mix with some kind of a gum, the soot or lampblack being prepared from the oil of sesame. In China India ink is used in both writing and painting, and it is applied with a brush. In Europe and the United States its principal use is in pen and ink drawings. Formerly India ink was made from a black secretion of the cuttlefish. See SEPIA.

Indian, EDUCATION OF THE. The first systematic attempt to educate the American indian was made by John Eliot in 1646 and the years immediately following. Eliot learned the language of the neighboring tribes, translated the Bible into this language and had copies of it printed on the first printing press set up in the United States. His efforts were so successful that during his lifetime he established fourteen towns of what were known as "praying indians." He induced the inhabitants of these towns to adopt the customs and dress of civilization and to be governed by the ordinary civil and religious laws of the State and Church. Eliot was followed by others, but, unfortunately, the

differences between the indians and the whites, leading to King Philip's and other indian wars, destroyed all of the results of their work, and nothing of importance was attempted for more than a century.

There was no attempt on the part of the government after the Revolutionary War to educate the indians, but the Cherokee and Creeks in Georgia were influenced by a number of white people who settled among them, to adopt some of the ways of civilization. Many of these indians learned to write and organized their tribes on a plan similar to that of the United States government. They were making excellent progress towards civilization when, during Jackson's administration, they were all removed to Indian Territory.

The first appropriation by Congress for indian education was in 1819, and the sum appropriated was \$10,000. From that time to the present, yearly appropriations have increased, until now they exceed \$3,500,000. These appropriations were at first applied to the support of schools founded by various religious denominations which believed it to be their Christian duty to educate the indians. As the schools increased in number, considerable jealousy developed among the different denominations, and the constitutionality of the appropriation to such schools was questionable. For these reasons, in 1901 the appropriations were withdrawn by Congress, and all money since appropriated by the government has been devoted to the support of government schools. These schools are of three classes, day schools, reservation boarding schools and non-reservation boarding schools.

DAY SCHOOLS. There are about 150 of these schools now supported by the government. They are located near the homes of the indians, so that both old and young are brought under the influence of the school. In some of these schools lunches are served during the intermission. All are in charge of the teacher and his wife, who assists in teaching the girls the various occupations connected with housekeeping and attempts to influence the mothers to change their manner of life. These schools enroll between 5000 and 6000 pupils.

RESERVATION BOARDING SCHOOLS. These are established on the reservations and are open to children of both sexes. They require the pupils to reside in the institution during the school year, where they are brought under the influences of civilization. Over ninety of

these schools are now maintained, and they enroll, in all, about 12,000 pupils. The best results are obtained in the smallest schools, and in no instance is it intended that over 200 pupils shall be gathered in a school. These institutions are located in Arizona, Oklahoma, South Dakota, Minnesota and on some other reservations.

NON-RESERVATION BOARDING SCHOOLS. These are institutions providing a higher order of instruction than the reservation boarding schools. In addition to the ordinary work of the school, somewhat extended courses in industrial work are provided. The most noted of these is the school at Carlisle, Pa., which has an enrollment of more than 1200 (See UNITED STATES INDIAN TRAINING AND INDUSTRIAL SCHOOL). The one next in importance is the Haskell Institute, at Lawrence, Kan., which has an enrollment of about 1000. In addition to these, there are schools at Salem, Ore., Chilocco, Okla., Phenix, Ariz., and in several places in California, South Dakota and Wisconsin. In some of these schools what is known as the *outing plan* is practiced. By this plan the students are placed in the families of farmers during the year, where they earn good wages, attend the public schools and are brought more directly under the family influence. In many instances this plan has been very successful.

SCHOOLS OF OKLAHOMA. When the Creeks, Cherokee and other tribes were removed to Indian Territory, they continued to maintain the institutions of civilization which they had previously established. In the course of time, what are known as the five civilized tribes, namely, the Cherokee, Choctaw, Chickasaw, Creeks and Seminole, established systems of public schools in their respective nations. They built excellent school houses, but until recently the results obtained from their efforts were not of the best, because of the work of unscrupulous local politicians. These schools are now under the direction of a superintendent appointed by the national government, and political influences have been removed. Most of the indians of these tribes have adopted the ways of civilization, have learned to read and write English and have also obtained a working knowledge of most of the branches taught in the common schools.

The government of indian schools is under the direction of the department of the interior and immediately under the supervision of the superintendent of indian schools, appointed by the

president. Under this superintendent are five supervisors, each looking after the work in a district to which he is specially assigned. The purpose of the schools is to teach the indians the English language and to bring them under the influences of civilization. Those who are most thoroughly conversant with the work and are securing the best results encourage the indians to maintain their traditions, such as their songs, folklore and many of their tribal and family customs. Education assists them to use these to much better advantage than they could in the uncivilized state, and it is the opinion of all students of ethnology that the traditions of the American indian should be carefully preserved.

Besides government schools, there are many schools established by the different religious denominations, all of which are doing work similar to that already described. Many of these schools maintain efficient corps of teachers and are exerting an excellent influence upon the tribes in which they are located.

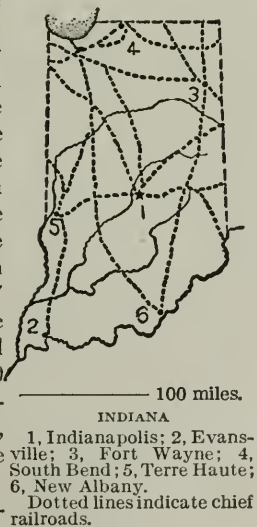
Indian'a, the HOOSIER STATE, one of the East Central states, is bounded on the n. by Lake Michigan and the State of Michigan, on the e. by Ohio, on the s. by Kentucky, from which it is separated by the Ohio River, and on the w. by Illinois, from the southern half of which it is separated by the Wabash River. The greatest length from north to south is 277 miles, the average width is 145 miles and the area is 36,350 square miles. Population in 1900, 2,516,463, of whom 57,960 were colored.

SURFACE AND DRAINAGE. In general the surface is a plain, sloping gradually to the south and west, but when studied in more detail, the state can be divided into three regions. The extreme southern region, including the counties bordering on the Ohio and those lying next to these on the north, has a decidedly broken and uneven surface, though it contains no very high hills or mountains. A portion of this region is characterized by extensive formations

of limestone, which have been washed by underground streams. In some sections these streams have disappeared, leaving immense sink holes and caverns. The most noted of these is Wyandotte in Crawford County (See WYANDOTTE CAVE). North of this region and extending from a line running across the state just south of Indianapolis to the Wabash River, is a broad, level plain with scarcely any variation in altitude, and north of the Wabash the surface is more undulating, consisting of rolling prairie. Along a northeast-southwest line extending from the extreme northeastern corner to Logansport is a range of sand and gravel hills, interspersed with hollows in which are found a number of small, shallow lakes. A smaller belt of hills and lakes crosses the northwestern corner of the state. Quite a portion of this region contains marshes, some of which have been drained and brought under tillage, forming excellent farms. Bordering on Lake Michigan are numerous large sand hills (See DUNES).

A small portion of the northeastern part of the state is drained by the Maumee into Lake Erie, and the Kankakee in the northwest drains a large area into the Illinois River and thence to the Mississippi. The southeastern counties are drained by the Whitewater, which enters the Ohio just across the eastern boundary. The remainder of the state is drained by the Wabash and its tributaries. The Wabash traverses the state from the northeast to the southwest and is joined by the White, its principal tributary, which, with its west fork and other tributaries, drains a large part of the south central region. The streams flowing into the Ohio from the southern counties are short and of little importance.

CLIMATE. The extent of latitude covered by Indiana causes a difference of about 9 degrees between the mean temperature of the northern and the southern tiers of counties. The summers are usually warm, and during July and August many hot days are experienced. Owing to the sweep of the north winds the winters, especially in the northern part of the state, are often severe, having from 75 to 90 days of freezing weather and sometimes as much as 40 inches of snow. In the southern half the winters are short and mild, and the snowfall here seldom exceeds 15 inches. The rainfall varies from 30 to 50 inches and is heavier in the south than in the north, the average for the state being about 43½ inches; but the periods of precipitation are unevenly dis-



tributed. July and August are liable to be dry months.

MINERAL RESOURCES. In 1904 Indiana was the second state in the production of natural gas and in the production of coal. The coal fields are situated in the southwestern portion of the state and are of the same formations as those found in Illinois. The coal is bituminous and one of its varieties is known to the trade as Indiana block. It is of excellent quality for manufacturing purposes and for making steam for engines. The natural gas field is located in the east central portion of the state and has an area of about 2500 square miles. To the northeast of this and including a portion of it is the oil field, which is very productive. The oil from this field is piped to Whiting, in the extreme northwestern corner of the state, where there are extensive refining works. Brick and tile clays are generally distributed over the state, and there are many deposits of building stone, that known as the Bedford limestone, found in the southern section, being especially valuable, both for construction work and for ornamental purposes.

AGRICULTURE. Agriculture is the leading industry of Indiana, and over 94 per cent of the tillable land is under cultivation. Hardwood forests are scattered over the state, though, except in the southern counties, they now cover only small areas, so that they do not interfere with agriculture. With scarcely an exception the soil is fertile and the rainfall abundant. The chief crops, in the order of importance, are corn, wheat, oats and hay. The counties near Chicago are well suited to truck farming, and large sections in this region are devoted to that branch of agricultural industry. Stock raising also receives attention throughout the state. There are large areas of valuable pasturage, and large numbers of horses, cattle, sheep and swine are raised. However, the raising of sheep is now confined almost entirely to the northwestern counties. Fruit is quite generally grown throughout the state, and in the southern half potatoes, plums, pears and small fruits are raised in quite large quantities.

MANUFACTURES. The presence of natural gas attracted to the gas belt a large number of industries which require a cheap fuel. These include glass factories, tin plate factories and foundries for the manufacture of iron and steel products. Since the decline of the gas supply many factories have been moved to the coal field. Sawmills, factories for the manufacture of agricultural

implements and articles made from lumber are quite generally distributed. Near Lake Michigan are large establishments which are closely affiliated with others in Chicago. The most important of these are the meat-packing houses. Distilleries, flour mills and factories for the manufacture of cotton, woolen and knit goods are also of importance, while quarrying and the manufacture of brick and tile employ a large number of people in several localities.

TRANSPORTATION. Indiana is traversed from east to west and from north to south by a large number of trunk lines of railway, which have their western centers in Chicago and Saint Louis and their eastern centers in New York, Boston and other large cities. With the exception of the two southern tiers of counties, all portions of the state are well supplied with railway facilities, but owing to the unevenness of the land in this region only a few lines have been constructed here. The entire mileage of the state exceeds 6600 miles, and in addition to this there are numerous electric lines joining cities to near-by towns, and the tendency is to extend these so as to form lines of communication across the state in various directions. The Ohio is the only navigable river which is of value to the state as a means of transportation.

GOVERNMENT. The legislative department consists of a senate of 50 members, elected for four years, and a house of representatives of not more than 100 members, elected for two years. The legislature meets every other year. The executive department consists of the governor and the lieutenant governor, each elected for four years, a secretary of state, a treasurer, an auditor, an attorney-general and a superintendent of public instruction, elected for two years. The judicial department consists of the supreme court, an appellate court and circuit courts. In addition to these there are superior courts in the large cities. In local government the township has greater recognition than in most states in the central part of the country.

EDUCATION. The state has an excellent school system, based upon the township plan. According to this, the township is the smallest unit for public school administration, and the schools of that unit are placed in the hands of a trustee who is elected by the voters of the township. The schools of each county are under the supervision of a county superintendent, who is chosen by the school trustees of the county. The public school fund amounts

to over \$10,000,000, and the income from this is supplemented by state and local taxation. The University of Indiana at Bloomington is at the head of the public school system. Purdue University, with the state agricultural and technical school, at Lafayette, and the state normal school at Terre Haute are also parts of the public school system. Other important educational institutions in the state are De Pauw University at Greencastle, Indianapolis University, the University of Notre Dame, Wabash College, Vincennes University, Rose Polytechnic Institute, the normal college at Valparaiso and a number of private normal schools, located at Angola, Rochester and Muncie.

INSTITUTIONS. The hospitals for the insane are located at Logansport, Richmond, Evansville and Indianapolis; the state soldiers' home is at Lafayette; the soldiers' orphans' home is at Knightstown; the school for the deaf, the dumb and blind is at Indianapolis; the state reformatory is at Jeffersonville, and the penitentiary is at Michigan City.

CITIES. The chief cities are Indianapolis, the capital and largest city; Evansville, Fort Wayne, Terre Haute, South Bend, Muncie, New Albany, Anderson and Richmond, each of which is described under its title.

HISTORY. The first permanent white settlement in Indiana was made at Vincennes (1734) by emigrants from Canada. But as early as 1680, La Salle had made explorations in the Ohio and Wabash valleys, and early in the eighteenth century trading and military posts, missions and settlements had been made at several points. The territory constituted a part of New France until 1763, when it was ceded to England. By the treaty of 1783 it became a part of the United States, having been conquered during the Revolution by a band of frontiersmen under George Rogers Clark. Indiana became a territory in 1800, including Michigan, Illinois and Wisconsin. In 1809 it was reduced to its present size. In 1811 the indians, who had been giving constant trouble, were defeated by General Harrison at the Battle of Tippecanoc. Indiana became a state in 1816, with a constitution forbidding slavery. After a period of financial weakness and political confusion, the state steadily prospered; and it has taken advanced steps toward the solution of political and industrial problems, such as the establishment of an industrial arbitration tribunal and an anti-trust law. The state has

been doubtful in politics for many years and has been the scene of memorable political battles. Consult Dunn's *Indiana* in the American Commonwealths Series.

Indian Affairs. The relation of the indian to the United States government is peculiar. He is treated not like a foreigner, nor like a citizen, but, in the words of the law, "as a domestic, dependent nation." Though authority to govern the indians rests entirely with Congress, it is the tendency of that body to place in the hands of the indians themselves, as long as a tribal organization is maintained, all powers of local government. In accordance with this theory, the United States government has by means of treaties gained possession of the lands within United States territory claimed by the indians and has restricted the tribes to certain comparatively small areas, where they are free to make their own regulations, subject to the Constitution and laws of the United States, and also to set up and administer courts (See INDIAN RESERVATIONS). This right, however, has been decidedly restricted within recent years.

Congress licenses traders among the indians and closely supervises their transactions by means of a bureau in the department of the interior, presided over by a superintendent of indian affairs, appointed by the president and confirmed by the Senate. He is assisted by inspectors, superintendents and agents, each of whom has a special duty in supervising the affairs of a special tribe. The president also appoints teachers and sends mechanics to the indians, the government having full control of certain indian schools, such as the training schools outside of the reservations and different kinds of boarding and day schools within the reservations. It also makes contracts for schools to be conducted by religious associations, and it formerly contributed funds for the support of these schools (See INDIANS, AMERICAN; FIVE CIVILIZED TRIBES; INDIAN, EDUCATION OF THE). The indians who receive individual allotments of land may be admitted to citizenship by naturalization, and they are by many states given the right of suffrage. There are probably twenty thousand indian voters in the United States.

Indianapolis, IND., a city, the county-seat of Marion co., capital of the state, 110 mi. n. w. of Cincinnati, on the Pittsburg, Cincinnati, Chicago & Saint Louis, the Lake Erie & Western, the Pennsylvania, the Monon and several other railroads. The city is noted for its wide,

well-paved and beautiful streets. The chief business streets are Washington, Market, Maryland and Georgia. Meridian, Pennsylvania and Delaware, the three finest residence streets in the city, Illinois, Massachusetts, Indiana, Virginia and Kentucky avenues radiate from Monument Place, a circular plaza in the center of the city. Woodruff Place, a residence park, is also of interest. There are nine public parks, nearly 1200 acres in area; Riverside, Garfield and Brookside are the most important. The first cemetery was Greenlawn, and others are Crown Hill Cemetery and several Roman Catholic, Lutheran and Jewish cemeteries.

The most notable structure in Indianapolis is the Soldiers' and Sailors' Monument, standing in Monument Place. It was designed by Bruno Schmitz and cost over \$500,000. The state-house, costing \$2,000,000 and occupying two large blocks, is the most noteworthy building. Others are the county building, costing \$1,750,000; the new Federal building, containing government offices; the police building, the public library, Tomlinson Hall, the Commercial Club, the Columbia Club, the Majestic, Law and Stevenson office buildings, and Claypool Hotel. There are 12 Roman Catholic churches in the city, 47 Methodist, 16 Presbyterian, 7 Episcopalian, 34 Baptist, 10 Congregational, 7 Lutheran and a few others. There are also many charitable institutions.

Indianapolis is the seat of the University of Indianapolis, including an academy known as Butler College, and law, medicine and dentistry departments. There is an excellent public school system and various other educational institutions. Among the important industries of the city are slaughtering and meat packing, iron works of various kinds, flour, grist and lumber mills and manufactories of carriages, wagons, furniture and malt liquors. There are also extensive printing and publishing establishments.

Indianapolis was settled in 1819, received its name two years later and became the capital of Indiana in 1825. The growth of the town dates from the opening of the first railroad in the state, in 1847. Since the introduction of natural gas, in 1889, the manufactures have increased rapidly and the city has grown. Indianapolis has had among its citizens Henry Ward Beecher and Benjamin Harrison. Population in 1900, 169,164.

Indian Archipelago. See MALAY ARCHIPELAGO.

Indian Architecture comprehends a great variety of styles, among which we may distinguish, as the most important, the Buddhist style, the Jaina style, the Dravidian, or style of southern India, the Chalukyan style and the Modern Hindu, or Indian Saracenic, style. All these styles possess certain common traits, among which are minute and profuse ornament, executed in laborious carving; the use of many horizontal lines and bands, giving a stratified appearance; a repetition of the same motive, and a neglect of structural requirements. Among the principal forms of Buddhist architecture, which prevailed between the third and seventh centuries A. D., are the following: First, the *topes*, *stupas*, or towers, built to mark some sacred spot, and the *dogobas*, constructions of a similar nature, containing relics of Buddha or Buddhist saints. These buildings generally consisted of a circular stone basement, varying from 10 or 12 to 40 feet in height, and from 40 to 120 feet in diameter, on which rose a rounded, dome-like structure, generally of brick or small stones laid in mud, the whole edifice rising sometimes 50, sometimes 100, feet high. Second, the rock-cut *chaitya halls*, or churches, and the *viharas*, or monasteries. In rock-cut buildings architectural skill is confined to the façade and the interior, which are generally cut out with most beautiful and perfect detail.

The Jaina style, most highly developed in the eleventh century, is an outgrowth or corruption of the pure Buddhist. The temples in this style consist of a small sanctuary, surmounted by a lofty and nearly solid tower, the whole standing in a court surrounded by small cells, each surmounted by a smaller dome. The Dravidian style, that of the peoples of southern India, arose not earlier than the tenth century. The characteristic feature here is the *gopura*, a lofty, truncated pyramid, covered with countless bands of sculpture and carved ornament.

The Indian Saracenic style is a general name for a number of somewhat varying styles, the result of the mixture of Saracenic principles of architecture, brought by the Mohammedan conquerors of India, and the distinctive architectural features of the different localities where they settled. Under the Mogul emperors in the sixteenth century were erected some most magnificent buildings, such as the tomb of Humayun Shah at Old Delhi, that of Akbar at Secundra, the palaces of Shah Jehan at Agra and Delhi, and the Taj Mahal, built by the same monarch at Agra. See TAJ MAHAL.

Indiana University, a state institution at Bloomington, Ind., chartered as a university in 1838. It comprises collegiate, law and graduate departments. It also maintains a summer school and a biological station on Winona Lake. The faculty numbers about 70, and the enrollment is about 1500. The library contains over 40,000 volumes.

Indian Cau'casus. See HINDU-KUSH.

Indian Corn. See CORN.

Indian Hemp. See HASHISH.

Indian Mal'low or **Vel'vet Leaf** or **Stamp Weed**, a weed of the mallow family, a native of Asia, naturalized in the United States. It is now a troublesome weed in all cultivated lands, especially in cornfields throughout the central states. It grows to a height of four feet, has heart-shaped, velvety leaves and flowers half an inch broad and of a bright orange-yellow color. The fiber of the plant is almost as strong as hemp. See WEEDS.

Indian Ocean, a large sea, separated from the Pacific Ocean on the e. by the Malay Archipelago and Australia and from the Atlantic Ocean on the w. by Africa. It is bounded on the n. by Asia. It extends to the Antarctic Circle on the s., although many geographers consider the part of the ocean south of latitude 40° south as the Southern Ocean. The northern shores are broken up by the projection of the peninsulas Arabia, India and Indo-China. Among the numerous islands in the Indian Ocean, Madagascar and Ceylon are the most important. The chief affluents are the Selwin, the Irawadi, the Brahmaputra, the Ganges, the Indus, the Chat-el-Arab, in Asia, and the Zambezi, in Africa. The winds over this ocean are gentle, though hurricanes are very frequent. The greatest depth is found in the northeastern part, where soundings have been made of 20,340 feet. The average depth is about 10,970.

Indian Reservations, *rez ur va'shunz*. For some years the United States has made treaties with the indians, reserving to them certain tracts of land, over which the United States continues to exert control, but where the indians are supposed to be protected from the imposition of the whites. The affairs of the reservation are conducted by an agent or superintendent, responsible to the commissioner of indian affairs, who is at the head of a bureau in the department of the interior (See INDIAN AFFAIRS). Indians on reservations are not citizens of the United States, though they may become so by settling on other lands, as ordi-

nary white settlers do. Many indians have accepted the conditions, and there are now more than 20,000 indian voters in the United States (See FIVE CIVILIZED TRIBES).

The Navaho reservation in Arizona has an area of about 9,500,000 acres and is the largest single reservation; South Dakota has in its seven reservations over 8,500,000 acres, and there are in the United States about 140 other reservations.

Indians, AMERICAN. The name *indians* was given by Columbus to the tribes inhabiting the American continent at the time of its discovery, because he had the notion that the land was a part of India. To science these tribes are usually known as the *American*, or *Red*, race, and they are considered as an original stock or as a mixture of various races of European or Asiatic origin. Their chief characteristics are long, black and straight hair, scanty beard, heavy brows, receding forehead, dull and sleepy eyes and prominent, wide nose, full, compressed lips and a broad face with high cheek-bones. They vary in size and shape, are frequently tall and symmetrical and generally have small and well-proportioned hands and feet. The indians were distributed over the whole of the western continent and varied in character as much as in stature, if we contrast the civilized peoples of Mexico and South America with the cannibal tribes of the tropics. In this article the Eskimo are not considered, though some writers treat them as belonging to the American race (See ESKIMO). It is probable that in the whole of America there are about 12,000,000 indians, of which less than half are to be found in North America. At the time of the discovery of America it is probable that about 200,000 indians resided east of the Mississippi River, while in 1900 there were in the entire United States only 266,760.

NORTH AMERICAN INDIANS. *Villages.* When Columbus discovered America the indians lived in villages, each tribe by itself, in dwellings peculiar to the tribe. Among the Pueblo indians in the southwestern part of the United States the houses were then, as now, built of mud and crowded together one above another upon the plain, or were built in almost inaccessible caves in the sides of high cliffs. In the Lake region, circular huts of bark, split in broad slabs, were built, while to the east and south, the wigwams were of the same material, but rectangular in shape. The plains indians, who traveled about much more than the tribes of

the east, built temporary *tepees*, or wigwams, of poles, over which they stretched skins of buffalo and other large animals. Generally one house was larger than any of the others, and in this the chiefs met for council; and around it was an open space, where the indians met for worship or amusement.

Dress. The everyday dress of the indians consisted of little clothing—no more than was necessary for comfort, some tribes going almost entirely naked. From the skins of animals, fibrous plants and the bark of trees the indians constructed the few garments which were necessary, except in the southwest, where the Pueblos made serviceable woolen garments. In times of ceremony most of the tribes dressed elaborately, with showy garments bedecked with shells, teeth, feathers and other bright objects. Enormous headdresses of feathers and brilliant necklaces, metal ornaments, earrings and bracelets were also a part of this full-dress costume. Not uncommonly the indians tattooed themselves, and always before going to war or engaging in any other great undertaking they painted their faces and bodies with bright colors in fanciful designs, which showed the tribe to which the indians belonged and their purpose in painting themselves.

Food. Most of the tribes cultivated corn, beans and squashes, and some of them, like the Pueblos, lived almost entirely by agriculture. Whenever possible, the indians ate freely of fruits and of other edible parts of many plants. The northern indians gathered and stored wild rice and cranberries and made syrup from the maple trees. East of the Alleghany Mountains tobacco was a general product, and along the seacoast and the Great Lakes fish formed a staple article of food. West of the Mississippi the indians were great hunters, but it is manifestly unfair to say that indians in general lived wholly by the chase. Except in times of scarcity, they were well fed and lived healthily and at ease.

Language. Tribes that lived near one another were able to communicate by means of signs or with a jargon of mixed words from all languages, and while many of these languages seem to have come from the same stock, yet more than fifty distinct and unrelated languages have been noted.

Domestic Animals. To our mind, the plains indian is so associated with his horse that it is surprising to remember that until the Spaniards brought the animals to this country there were no horses here. Domestic animals, in fact, were

very rare, the dog being the only one that was common and almost universal. To many tribes he was a beast of burden, a companion-hunter and a protector.

Industries. Flint, obsidian and pipestone were used by the indians in making most of their implements, such as knives, spears, fishhooks, sewing needles, axes, pots, bowls, mortars and pipes. Many of these were cut out with considerable skill and were handsomely decorated. Some tribes made an article of pottery from clay, and though they did not understand how to glaze it, yet some of their work was capable of taking a high polish. From rushes and grass and the fibers of various plants, such as hemp and cotton and their like, they wove coarse fabrics, and some tribes constructed household utensils with marvelous skill; for instance, baskets of graceful shape, beautified by antique designs, were woven so closely as to be waterproof. They understood the art of preserving skins and making fine leather from them. This and all other industries were practically in the hands of the women, for the men considered it a disgrace to labor.

Games and Amusements. Boys and girls played happily very much as their white brothers and sisters do, imitating in their childish way the labors and amusements of their elders. The girls had dolls, often dressed skillfully in the costumes of grown men and women; while the boys played with bows and arrows, walked on stilts, wrestled among themselves or went on mimic hunting and fishing expeditions. The adults, too, were fond of amusements, most frequently of an athletic type. They played ball, ran races, wrestled, danced, feasted and told stories, and many times neighboring tribes joined in exciting contests. They sang on all occasions, but their music was coarse and rude, being, in fact, little more than monotonous chants. They had rude drums, whistles, rattles and flutes, all of which were more noisy than musical. Betting and gambling were very common among the men, who frequently lost all their possessions when luck was against them.

War. The highest ambition of a youth was to be a great warrior, for the tribe celebrated the deeds of its leaders and kept a record of their valiant doings. In most instances the indians were courageous to a degree, wore no armor and fought savagely with bows and arrows or knives, hatchets and spears of stone. The indians were cruel and usually scalped the dead, and the victors put their captives to death, sometimes



AMERICAN INDIANS

1, Mandan.
2, Blackfoot.
3, Dakota.

4, Yucatan.
5, Sioux.
6 and 7, Pueblo.

8 and 9, Mexican.
10, South American.
11, Apache.

12, Bellacoola.
13, Eskimo.

with cruel torture. Occasionally, however, these captives were adopted by the victors and became loyal members of the tribe that had subdued them. The victorious fray was always celebrated with feasting and dancing, and sometimes the flesh of conquered braves was eaten by the victors in the belief that the virtues of the dead would be transmitted to the living.

Burial. Though the customs varied in different localities, yet great respect was paid to the dead, and efforts were made to preserve the bodies and protect them from indignity. Usually the favorite possessions of the deceased were buried with him, sometimes in the earth, but occasionally on platforms among the trees.

Government and Religion. It is difficult to give any account of the government and religion which will apply to all the tribes, but in general each tribe was composed of a number of related families or clans. The oldest man in each clan was its leader and ruler, and in turn the oldest head of a clan was the chief of the tribe. Marriages among members of immediate families were forbidden, but there were rarely any marriages outside the members of a tribe, except in those cases where tribes were gathered in a confederacy. Children usually belonged to the mother and were cared for by her relatives, so that a man kept ward over his sister's children rather than his own. Laws were very strict, and punishments were severe. Land was not owned by individuals, but personal property was so held. The limited rights of woman were respected, especially in the household, but the man was supreme. Some tribes held slaves, but the practice was far from common.

For the indian there was no supreme god; each tribe had its own spirit, that was its special patron. Every living thing was inhabited and controlled by a spirit. The sun, moon and stars were the great spirits; the wind was the breath of the gods, and rain and snow were poured upon the earth by the kindly spirits. The animal or plant which was to any particular tribe most important might become the chief spirit for that tribe, as, for instance, on the plains the buffalo held this rank. The priest and the medicine man were one and the same person, in his latter capacity curing by charms and ceremonies because of his priestly characteristics. While a few simple remedies were used, yet each indian carried his private charm, which was supposed to protect him from injury and assist in his cure when ill.

Tribal Families. The indian tribes of North America may be gathered into a number of families which show some relationship in language and various habits and customs. The principal families are the Algonquian, Athapascan, Caddoan, Iroquoian, Muskogean, Shoshonian and Siouan, to each of which is given an article in the body of this work.

Present Condition in the United States. What has been said so far in this article relates to indians as they were at the time of the discovery of America, but since then there has been a remarkable change in their condition. In the northern part of the United States the French, and at the south the Spanish, intermarried freely, and the mixed breeds which resulted have become civilized and adopted the customs of their white neighbors. The other European colonists rarely mixed with the indians, but have endeavored to teach them their arts. War and conquest followed this, and the indians were gradually driven away from their hunting grounds, across the Mississippi River and into mountain fastnesses or desert and unprofitable regions. Here and there the remnants of tribes have been gathered into gradually lessening tracts of land, called reservations, where the indians live under the protection of the United States; but as they do not understand private ownership in land and cannot readily accommodate themselves to the plans of the whites, trouble has frequently arisen. Some few tribes have proved more tractable than others and live comfortably as we do. Very few wild tribes now remain in the United States. See INDIAN AFFAIRS; INDIAN, EDUCATION OF THE; INDIAN RESERVATIONS; FIVE CIVILIZED TRIBES, and the many articles on single tribes.

MEXICAN AND CENTRAL AMERICAN INDIANS. At the time the Spanish invaded Mexico and Central America, they found there many tribes having a civilization almost the equal of their own. These indians built permanent houses of squared and polished stone, had a written language and many books, knew something of arithmetic and a little of astronomy. They made finely woven cloths, brilliant feather work and beautiful ornaments of gold and silver. Of iron they knew nothing. Their religion, bloodthirsty and cruel, was characterized by human sacrifices, and their priests exerted a power little less than that of the king himself (See AZTEC; CORTEZ, HERNANDO; MONTEZUMA; YUCATAN). In contrast to these, the indians of Lower California were the most degraded savages known.

Indian Summer

SOUTH AMERICAN INDIANS. Along the western coast of South America, from a few degrees north of the equator to 25° south of it, were several tribes with a civilization equal to that of the Aztec in Mexico. They built great palaces, the ruins of which still exist, and ornamented them with fine work in gold, silver and bronze. The conquering Spaniards were amazed at the skill of the indians and carried away with delight vast quantities of their ornaments (See *ATAHU-ALPA*; *INCA*; *PIZARRO*, FRANCISCO). The tribes of the tropical regions bordering the Amazon and Orinoco were wild and savage. They knew nothing of work, for the climate made clothing and shelter almost unnecessary, and the streams and forests produced food for the taking. Most of them were fierce cannibals, who did not preserve the scalps of their enemies, though in some cases the entire head was kept. The pampas indians to the south were more like the plains indians of the United States. They were not civilized, but had large herds of domestic animals and lived principally upon meat. See accompanying color plate.

Indian Summer, the season of fair, warm weather, which occurs usually in the late fall in the North Central and Atlantic states. It lasts from one to three weeks and may occur three or four times in one season. The air is usually especially dry at this time, and consequently forest and prairie fires are likely to start. The name is of obscure origin, though it was once believed that it was due to the fact that the indians predicted this period, in conversation with the first Europeans who arrived in America.

Indian Territory. See *OKLAHOMA*, sub-head *History*.

Indian Turnip. See *JACK-IN-THE-PULPIT*.

India Rub'ber or **Caoutchouc**, *koo chock'*, a gum obtained from the sap of a number of tropical plants, which belong to different families and are usually known as rubber plants. While these species differ in some particulars, they all resemble each other in having a milky sap, which, when dried, yields rubber. The crude rubber is commonly obtained by making cup-like incisions in the trunk of the tree and then cutting grooves in the bark leading to these cups. The sap flows into the cups, from which it is taken with small dippers. From this sap the rubber is prepared by drying over a fire or in the sun. The best rubber, however, is prepared by drying the sap over a fire. This is done by constructing a hollow cone of clay, with an aperture at the smaller end, then placing this

India Rubber

over the fire and holding a paddle, which has been dipped into the sap, over the mouth of the cone. As fast as the quantity collected is dried, more is added by dipping the paddle into the sap, until a mass weighing five or six pounds has been collected. This is removed from the paddle by cutting it through on one side. It is then ready for shipment in the form of crude rubber.

India rubber is highly elastic, is a non-conductor of electricity and a poor conductor of heat. It is not dissolved in water of any tem-



CAOUTCHOUC PLANT

perature, but chloroform, naphtha, oil of turpentine and bisulphide of carbon dissolve it readily. While india rubber has been known for many years, its general use dates from about 1825, when Mackintosh in England took out a patent for the waterproof materials prepared from it and which bear his name. About twenty years later Goodyear discovered the process of hardening, or vulcanizing, rubber by the use of sulphur, and the real rubber industry dates from that time. See **RUBBER MANUFACTURE**.

The greatest supply of crude rubber is obtained from the forests of the Amazon basin, and nearly all of that used in the United States comes from these regions. Rubber plantations are also

Indictment

found in Central America and in Mexico, and when properly managed they yield a good income to the proprietors. The basin of the Kongo River in Africa also contains a large supply of rubber, but little or none of this is ever found in the United States, the rubber obtained from this source being used to supply the markets of Europe.

Indictment, *in dite'ment*. See JURY AND TRIAL BY JURY; PROCEDURE.

In'digo, a blue vegetable dye, extensively employed in dyeing and calico printing. The greater part of the indigo at the present day comes from India, especially from the provinces



INDIGO PLANT

of Bengal, Oude and Madras. The first cutting of the plants takes place about midsummer, and the second about two months later. The process of extracting the dye varies as the leaves are fresh or dried. The leaves are usually boiled and allowed to ferment under water. The liquid is then drawn off and beaten, in order that it may mix with oxygen, after which it is allowed to stand for some time. When the indigo settles to the bottom, the water is then drawn off and the indigo is cut and pressed into cubes, in which form it appears on the market. Commercial indigo contains about fifty to sixty per cent of pure indigo blue, the remainder consisting of substances called indigo gluten, indigo yellow and indigo red. Indigo dyes are made by dis-

Indra

solving the coloring matter in liquids containing more or less ammonia or some other alkali. They are used in coloring silk, cotton and woolen goods and extensively in calico printing. See CALICO PRINTING; DYEING.

Indigo Bird, a finch which breeds in Northern United States but migrates beyond the southern boundary in autumn. The male is a brilliant dark blue, varying in intensity, and is marked about the head and chin with black. The indigo bird, which has a confiding disposition and is easily tamed, repays kindness with its sweet, peculiar song, which is continued into the summer, after most of the birds have ceased to sing.

In'dium, a metal discovered by Reich and Richter in 1863, by means of spectroscopic analysis in the zinc-blende of Freiburg. It has been obtained in small quantities and is of a silver-white color and soft. It marks paper like lead. The metal is related to cadmium and zinc, and its spectrum exhibits two characteristic lines, one violet and another blue.

In'do-Chi'na, a name sometimes given to the southeastern peninsula of Asia, comprising Burma, Siam, Cambodia, French Cochin-China, Tongking, Anam, Laos, Malacca and the Shan country.

Indo-Eur'ope'an. See ARYAN.

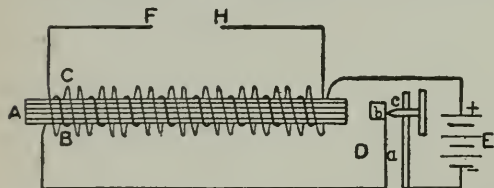
In'door Base'ball, a popular gymnasium game, that does not differ much in character and purpose from the outdoor game, except as it is of necessity modified to suit the small ground on which it is played. A floor 40 by 50 feet is almost a necessity, but the shape and size beyond that does not matter. The ball, which weighs $8\frac{1}{2}$ ounces, is about 17 inches in circumference, and the bat is smaller than the one used in the outdoor game. There is a national indoor baseball association in the United States, which regulates the game and formulates the rules under which it is played.

In'dra, a Hindu deity, originally representing the sky or heavens, worshiped in the Vedic period as the supreme god, though he afterward assumed a subordinate place in the Pantheon. He is commonly represented with four arms and hands, riding on an elephant. When painted he is covered with eyes. He is at once beneficent, as giving rain and shade, and awful and powerful in the storm, as wielding the thunderbolt. In one aspect he is lord of *Swarga*, the beautiful paradise where the inferior gods and pious men dwell in full and uninterrupted happiness.

Induction, in logic, that process of reasoning by which we rise from particular to general notions; it is the counter-process to deduction. In induction, particulars are not only raised into generals, but these are developed into still higher generalities. In following this method we proceed from the known to the unknown and obtain a conclusion much wider than the premises. See **INDUCTIVE METHOD**.

Induction, **ELECTRIC**, the action by which the distribution of a charge of electricity on a conductor is altered by the approach of an electrified body. When a body charged with one kind of electricity is approached toward an insulated conductor which originally had no charge, a charge similar to that of the influencing body is produced on the remote side, and an equal charge of the opposite kind is produced on the near side of the insulated conductor. It is to the mutual induction between the two coatings, one charged positively and the other negatively, that the Leyden jar is indebted for its large electrical capacity. See **ELECTRICITY**, subhead *How Electricity Travels*.

Induction Coil, an instrument for securing a high potential between direct and induced



electric currents. The principal parts of the coil are the *core*, *A*, usually made of a bundle of soft iron wire soldered together at the ends; a short *primary*, or *inner*, *coil*, *B*, of coarse wire; a long *secondary*, or *outer*, *coil*, *C*, of fine wire; an *interrupter*, *D*, and the *battery*, *E*. The coils are of insulated copper wire and are carefully insulated from each other by coats of varnish or some other non-conducting substance.

The interrupter consists of a spring, *a*, to the upper end of which is soldered a small piece of soft iron, *b*, against which a screw, *c*, presses. The screw is tipped with a fine platinum point. When not in action, the end of the spring rests against the platinum point. As soon as the current passes through the primary coil, the core, *A*, becomes magnetized and attracts the piece of soft iron, but as soon as this touches the core, the magnetism ceases and the spring recoils to the platinum point. The interruption of the current in *A* generates an opposite current in *B*,

and since the vibrations of the spring are very rapid, this induced current is strengthened by the frequency of its waves. The length of the coil *B* and the fineness of the wire give this induced current a strong potentiality. When the opposite ends of the coil, *F* and *H*, are brought near each other, a spark usually passes between them. Induction coils are used for medical purposes in laboratories and in common and wireless telegraphy and in telephones. See **ELECTRO-MAGNETISM**.

Inductive Meth'od, in pedagogics, that method of instruction which proceeds from the individual to the general notion, or from separate ideas, gained through observation, that is, *a posteriori* information, to definitions, rules and classifications (See **A PRIORI** AND **A POSTERIORI**). It is also called the observational method and the method by discovery. Children obtain their first knowledge by observation and experience; hence they learn inductively, and from the comparison of ideas thus gained they form certain conclusions or class ideas, such as that a body without support will fall, fire is hot, two and two are four. In a similar manner, by the inductive method the child learns the principles of number and is led to formulate the rules for addition, subtraction, multiplication and division. In nature study he proceeds through the examination of plants and insects and other objects to discover certain facts common to all the objects of each class, as, that plants have leaves and insects have heads and legs. In the study of geography by the inductive method, the pupil would begin with the study of objects immediately about him, such as the forms of land and water and the plant and animal life around the schoolhouse and in the neighborhood. From this he would proceed to the study of the township and the county. During the progress of the study he would be led to classify and name those objects that are alike, such as hills, valleys, creeks and meadows. Having learned these classifications, later he would be able to apply them in the classification of similar ideas which he might obtain through reading descriptions of places which he has never seen.

The inductive method is the method best suited to instruction in primary grades. It conforms to the child's method of learning when he enters school, trains his powers of observation, keeps him interested in his work and, above all, leads him to acquire his ideas at first hand. With few exceptions it is also the best method to use in beginning the study of any subject. It is

the method pursued in all scientific investigations, and it is that this method may be followed that the higher institutions of learning, such as high schools, colleges and universities, are equipped with expensive laboratories.

But the inductive method has its limitations and cannot be used exclusively. It requires too much time to be followed all through life; hence, when pupils arrive at the age where they can reason, they should depend upon the experience of others for a part of their knowledge. For instance, in the study of grammar, more knowledge can be acquired in a given time by beginning with definitions and rules and learning their application through the study of suitable illustrations in selections of literature, than by first discovering these definitions and rules by observation and experiment. Some studies, such as higher mathematics and history, are essentially deductive in their nature and cannot be successfully studied by the inductive method. Again, conclusions reached through the inductive method may be erroneous because they are based upon insufficient observation. See DEDUCTIVE METHOD; METHODS OF TEACHING.

Indulgence, *indulgens*, a term in the Roman Catholic Church, meaning "a remission of punishment still due to sin after sacramental absolution, this remission being valid in the court of conscience and before God; and being made by an application of the treasure of the Church on the part of a lawful superior." "Indulgence can not be obtained for unforgiven sin. Before anyone can obtain for himself the benefit of an indulgence the guilt must have been washed away, and the eternal punishment, if his sin is mortal, must have been forgiven." In order to gain an indulgence the person must be a member of the Church and must do the work prescribed. In the Middle Ages almsgiving, pilgrimages and engaging in holy wars were means of obtaining indulgences. Indulgences are plenary and partial. A plenary indulgence is the total remission, and a partial indulgence a partial remission of the temporal punishment due for sin.

Indus, the chief river of the northwest of Hindustan. It has a length of about 1800 miles and rises in Tibet, north of the Himalaya Mountains, at an elevation of 18,000 feet. The chief tributary of the Indus is the Shayok, and others are the Kabul, the Punjnud, the Sutlej and the Chenab. The Indus enters the sea by many mouths. Its delta extends about 130 miles along the coast. It is navigable from the sea up to its confluence with the Kabul River.

Indus'trial Arbitration. See ARBITRATION.

Industrial School, a name which has been frequently applied to a class of schools intended for reformatory or philanthropic purposes, in which trades and industrial work of all kinds are taught. In such schools the industrial work is taught merely as a means of discipline, while the primary purpose is to develop character or intellectual power. Many states have established such institutions. These, however, are generally known by other names, as reform schools or reformatories. See TECHNICAL EDUCATION; MANUAL TRAINING; REFORM SCHOOLS.

Inf'ant, a term applied in English and American law to persons who have not attained their majority, that is, the age of twenty-one years for a male and, in many states, eighteen years for a female, and are under guardianship. In general, contracts made by infants are not binding, except for necessities suited to their state in life. Being an infant is no bar to criminal proceedings; but young persons are not punished for offenses if they have not knowledge and discretion to distinguish them to be such. Infants require the consent of parents or guardians to marry. The jurisdiction in respect to infants is generally vested in either probate or orphans' courts. These courts appoint guardians to take charge of the property of infants, and, in case of the decease of both parents, to take charge of their persons; but during the life of the father he has the guardianship and control of the persons of his children until they are twenty-one years of age. In most states this power rests with the mother in case of the death of the father.

Inf'antry, the principal branch of modern armies (See CAVALRY; ARTILLERY). Infantry maneuvers rapidly and fights on foot. To this arm of the service belong the militiamen, who can be trained rapidly (See MILITIA). Most of the great armies of the past have been of infantry, and we read in history of the solid phalanx, eight or ten files deep, that moved with almost irresistible force against the foe. Such formations are no longer successful, since the modern rapid fire guns have been invented, guns which will throw bullets with such force that they pass through five or six ranks of troops. Accordingly, an open or extended order of advance is now necessary with infantry, and this openness requires more perfect discipline and more individual intelligence than when the infantryman was closely supported by his comrades. See ARMY; SMALL ARMS; TACTICS.

Infection, a diseased condition produced by the growth of bacteria in the body. Every infectious disease, as scarlet fever, smallpox, diphtheria, typhoid or cholera, is propagated by some organism. These are freed from the diseased body by expectoration, coughing, breathing and various other means and are thus liable to be transmitted to others. This may be done either directly or through the contamination of drinking water or milk.

Infin'ity and In'finites'im'al. A number which is conceived to be larger than any number to which a definite value can be assigned is said to be an infinite number, or is known as *infinity*. Its symbol is ∞ . The idea of infinity arises from the evident fact that space and time have no limit. It has been of great service in the development of higher mathematics, by giving an absolutely general basis for reasoning about specific relations. For instance, in studying a straight line, though it can only be designated by naming its limits, it is sometimes helpful to conceive of it as extending indefinitely.

An *infinitesimal* quantity is one conceived to be immeasurably small, but not equal to zero.

The fraction $\frac{1}{x}$, in which x is considered to be a quantity larger than any assignable value (∞), is an infinitesimal quantity, for as we increase x , the value of the fraction correspondingly decreases. Eventually it must become so small that it cannot be measured, yet as long as x has a value the value of the fraction can never quite vanish. The symbol of the infinitesimal is 0, so in mathematics the expression $\frac{1}{\infty}$ is often made equal to zero.

In'fluen'za or Grippe, a disease which usually appears as an epidemic and attacks human beings, horses and sometimes dogs and cats. The symptoms are those of what is usually called a severe cold; but this is accompanied by lassitude and great general depression, feverishness, nausea and even an inflamed condition in the throat and pharynx. Though the patient usually recovers within a week or ten days, he is liable to be left in a much weakened condition, in which other diseases, such as bronchitis or consumption, develop, or any organic weakness he may have had, much increases. The disease should not be treated lightly, but should be recognized as an affection requiring care.

Infuso'ria, a class of minute microscopic animals, so named from being frequently developed in infusions of hay or other organic sub-

stances. They are regarded as the highest group of the protozoans, but many of the so-called infusorians of former times are known now to be vegetable organisms.

In'galls, JOHN JAMES (1833-1900), an American statesman and writer, born at Middleton, Mass. He graduated from Williams College in 1855 and was admitted to the bar two years later. He went to Kansas in 1858, being interested in the antislavery movement which was centering there, became secretary of the state senate in 1861 and a member of that body in 1862. He entered journalism, became editor of the *Atchison Champion* and for his faithful party service was elected to the United States Senate in 1873 and was reelected in 1879 and 1885. During this service he displayed notable ability as a speaker and parliamentarian, and in his later years he attracted attention by his literary and oratorical talents.

Ingalls, MELVILLE EZRA (1842-), an American capitalist, born at Harrison, Maine. He was reared on a farm, was educated at Bowdoin College and graduated in law from Harvard, beginning practice at Gray, Maine, but soon removing to Boston. He was elected to the state legislature in 1867 and soon became interested in western railroads, being responsible for the organization and progress of the Cleveland, Cincinnati, Chicago & Saint Louis railroad, known as the "Big Four" system, of which he became president. He was also for twelve years president of the Chesapeake & Ohio railroad company and was interested in numerous banks and other corporations. He was defeated as a candidate for mayor of Cincinnati in 1903. In 1905 he was chosen president of the National Civic Federation.

Ingelow, in'je lo, JEAN (1820-1897), an English poet and novelist, of whose private life little is known. In 1863 she published her second volume of poems, which gained immediate and wide popularity; and some of the poems included in this volume, notably *The High Tide on the Coast of Lincolnshire*, *Songs of Seven* and *Divided*, have retained much of their early popularity. Jean Ingelow wrote *Mopsa the Fairy*, *Off the Skelligs*, *Sarah de Berenger*, *Don John*, *Fated to be Free* and *Stories Told to a Child*.

In'gersoll, JARED (1749-1822), an American politician and jurist, born in New Haven, Conn., and educated at Yale College. He studied law in London, but at the opening of the Revolution went to Paris, where he associated with the American representatives, including Benjamin

Ingersoll

Franklin. He returned to America in 1778 and engaged in the practice of law at Philadelphia. Two years later he was elected to Congress, was a member of the constitutional convention in 1787 and was at one time attorney-general of Pennsylvania and district judge.

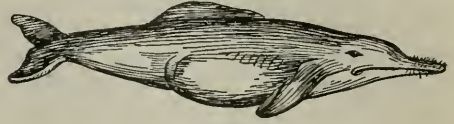
Ingersoll, ROBERT GREEN (1833-1899), an American lawyer, politician and agnostic writer, born in Yates County, N. Y. He began the practice of law in 1857 in Peoria, Ill., and in 1862 he was made colonel of a regiment of Illinois cavalry. He was appointed attorney-general for Illinois in 1866, having transferred his allegiance from the Democratic to the Republican party. At the national convention in 1876 he at once leaped into prominence by an eloquent speech in favor of the candidacy of James G. Blaine. He was best known, however, for his lectures and books in opposition to the common religious views, such as a personal Deity, an actual hell and heaven, the inspiration of the Bible, the divinity of Christ, immortality and everlasting punishment. His remarkable eloquence and personal magnetism gave him an influence in favor of agnosticism second only to that of Thomas Paine, from whom he drew most of his arguments. He was the author of several essays upon literary criticism.

Inha'ler, an apparatus for inhaling vapors and volatile substances, as steam, vapor of chloroform and iodine. It consists of a tin can, containing a small spirit lamp, and above this is a small kettle for hot water, the steam of which is driven out with some force when the apparatus is used. Attached to the can is a receptacle for receiving a small vial containing the substance whose vapor is to be inhaled, this being drawn off and forced through the funnel by the steam.

Inheritance Tax, a tax on the succession of property from a deceased person to his legatees. This tax has been used as a means of revenue by all countries since the time of the Roman Empire. In the United States certain states now have inheritance taxes, some of them differentiating between the succession of property to lineal descendants and the succession to collateral heirs. The rate is usually progressive, that is, large inheritances are taxed at a greater rate than small inheritances, and there is usually an exemption varying from \$500 to \$5000. The courts have held that deathbed gifts, made obviously to avoid the inheritance tax, are liable to the tax the same as any other part of the estate. These taxes are known as *death duties* in England.

Ink

In'ia, a genus of mammals belonging to the dolphin family, containing only one known species, remarkable for the distance at which it is found from the sea. It frequents the remote tributaries of the river Amazon and even some of the elevated lakes of Peru. It has bristly



INIA

hairs on its snout and grows to a length of eight feet. Its colors are extraordinary, some individuals being wholly pink and others black above and pink beneath.

Initiative. See REFERENDUM.

Injunction, in American law, a writ issued under the seal of a court of equity to restrain the defendant from doing, or to order him to do, some act, according to justice. An injunction is *temporary*, *provisional* or *preliminary*, until the coming of the defendant's answer; if that answer does not convince the court that the injunction is doing injustice, the injunction is made *perpetual*. Disobedience of an injunction constitutes contempt of court and is punishable accordingly.

Ink, a colored fluid used in writing and printing. The black writing ink of commerce is the most common kind. It is made from nut galls, copperas, gum senegal and water. Twelve pounds of nut galls, 5 pounds of copperas and 5 pounds of gum make 12 gallons of ink. In much of the ink placed on the market, logwood takes the place of nut galls, since it is somewhat cheaper. The iron in the copperas acts upon the tannin in the solution of nut galls and on exposure to the air turns this black. This is the reason why ink turns dark as it dries. The so-called writing fluids contain little or no coloring matter except such as is formed by the union of the copperas with the tannin, but inks usually contain other coloring matter, so that they can be more readily seen as they are placed upon the paper.

Colored inks are prepared by dissolving various dyes in water to which a solution of gum arabic or some other gum is added. Red ink is made from Brazil wood or carmine or aniline dye. Blue ink is colored by Prussian blue. Green ink is usually made from the aniline dye. Copying inks contain a small quantity of glycerine or sugar to prevent their rapid drying and to enable them to stick to the copying paper.

Printing ink is made by mixing the best quality of lamp black with boiled linseed oil, to which a small quantity of soap and rosin has been added. This ink is thicker than paint and is thoroughly mixed and ground, making a preparation that will flow readily over the ink rollers and spread evenly upon the type. See PRINTING.

Inkermann, *in kur mahn'*, a locality of Russia, in the Crimea, at the head of Sebastopol harbor. It is famous for the victory of the allies in the Crimean War over the Russians, on November 5, 1854.

In'man, HENRY (1801-1846), an American painter, born at Utica, N. Y. He studied in New York City and soon became famous as a portrait painter. Among his famous portraits are those of Fitz-Greene Halleck, Chief Justice Marshall, William Wirt, John James Audubon, De Witt Clinton, Martin Van Buren, William H. Seward, William Wordsworth, Thomas Macaulay and many other famous men. At the time of his death he was painting a series of historical pictures for the decoration of the national capitol at Washington.

Inn and Inn'keeper. See HOTEL.

Inness, *in'es*, GEORGE (1825-1894), an American landscape painter, born at Newburg, N. Y. No painter has represented the aspects of nature in the American climate with deeper feeling or with a finer sentiment of light and color. His *American Sunset* was selected as a representative work of American art for the Paris Exposition of 1867. His pictures were also exhibited at the Paris Exposition of 1900. Among his many celebrated paintings are *A Vision of Faith*, *Rising Storm*, *The Afterglow* and *Sunset on the Seashore*.

Innocent, *in'no sent*, the name of thirteen popes. INNOCENT I, a cardinal deacon created by Saint Damascus, was elevated to the pontificate near the close of 401. In the same year he went to Ravenna in relation to the capitulation between King Alaric and the Senate of Rome. The following year the city was plundered by the Goths, but Innocent, after their departure, undertook to repair the damage they had done and to redecorate the churches they had despoiled. He espoused the cause of Saint Chrysostom, who had been unjustly deprived of the See of Constance. He governed the Church with exceeding benefit for over fifteen years and after his death was canonized. INNOCENT II, Gregorio de Papareschi, was pope from 1130 to 1143. He was opposed by a faction of the cardinals who set up Anacletus II as antipope. In 1133

he was installed in the Lateran at Rome by the emperor Lothair, but did not gain undisputed possession before the death of Anacletus in 1138. In 1139 he held the second Lateran Council and confirmed the condemnations pronounced by several previous councils on Abélard and the followers of Brescia. INNOCENT III, Giovanni Lothario Conti, after a distinguished career as a student at Rome, Paris and Bologna, was made cardinal, and eight years later, at the age of thirty-eight, he became pope. He was the greatest pope of the name and held office from 1198 to 1216. The chief aim of his ecclesiastical policy was to vindicate the papal claim of the supremacy of the Church over the State. He began with the restoration of the papal authority in Rome, but soon extended his influence to all parts of Europe. He forced Philip Augustus of France to take back his repudiated queen; instituted the fourth Crusade, which resulted in the capture of Constantinople from the Greeks and the establishment of the Latin Empire; compelled John of England to acknowledge the feudal sovereignty of the pope and pay an annual tribute; instituted the crusade against the Albigenses in 1208 and presided at the celebrated Lateran Council in 1215. He was, moreover, an energetic worker for public and private morality and lent his influence to the advancement of every good cause. He died in 1216, while busily engaged in promoting peace among the Italian cities. INNOCENT XI, Benedetto Odeschalchi, who was pope from 1676 to 1689, was an energetic and judicious reformer. Throughout his pontificate he was involved with Louis XIV in conflicts, of which the most serious arose when the pope attempted to put an end to the king's practice of keeping sees vacant and appropriating their revenues. The French clergy expressed their views of the matter in their *Four Propositions of the Gallican Clergy*. INNOCENT XII, Antonio Piguatelli, after filling a number of important diplomatic posts, was made a cardinal by Innocent XI and was elected to the papacy after a session of the conclave lasting nearly six months. During his papacy (1691-1700), he brought about a reconciliation with France after the French clergy had retracted the *Four Propositions*.

Innocents, FEAST OF HOLY, variously styled Innocents' Day and Childermas, a festival observed in the Western Church (including the Anglican) on the 28th, and in the Eastern Church on the 29th, of December, in commemoration of

the massacre of the children of Bethlehem by the order of Herod.

Innsbruck, *ins'brook*, the capital of the Austrian crownland of the Tyrol, situated in the Alps, at an elevation of nearly 1900 feet, 60 mi. s. by w. of Munich. The city lies on both banks of the Inn, in a broad valley surrounded by high mountains, and is a favorite resort of travelers. The town is very old. It received municipal privileges from Otho I in 1224. The old town lies on the right bank of the Inn and is connected with the new town by three iron bridges. There are many interesting old buildings in the city, one of them being the oldest Capuchin monastery in Austria, dating from 1598. The Franciscan Church contains a magnificent monument to Maximilian I, several monuments to Tyrolese patriots and a beautiful silver statue of the Virgin. Among other noteworthy features are a fifteenth century palace; the Imperial Palace; the Ottoburg, dating from the thirteenth century; the Tyrolese National Museum; the historic and beautiful Isel Mountain, and the famous medieval Ambras Castle, with its great collection of weapons. Innsbruck is the seat of a university founded in 1667 by Leopold I. The chief industries are cotton and wool spinning, glass painting and the manufacture of mosaics. Population in 1900, 27,056.

Inns of Chancery, *chan'sur ry*, buildings in London which were originally schools for the study of law, and which for a time were subordinate to the Inns of Court and had similar powers. They are now merely private societies of lawyers.

Inns of Court, four sets of buildings in London, belonging to four legal societies which have the exclusive power to admit persons to the practice of law. The name is also applied to the societies themselves. They are of very ancient origin and in the Middle Ages were the seat of law schools famous throughout Europe. At present they are practically clubs of attorneys. Each is governed by a committee, or board, which is self-perpetuating and which has the absolute right to admit or reject any candidate for admission to the bar or to disbar any practicing lawyer which it has admitted. The four buildings are by name the Inner Temple, the Middle Temple, Lincoln's Inn and Gray's Inn.

Inoc'ula'tion, in medicine, the introduction by a surgical operation of a minute portion of infective matter into the true skin, for the purpose of causing artificially a milder form of

some contagious disease and thereby protecting the system against similar attacks in future. Such a process can be effective only in such diseases as attack us but once in the course of our lives, such, for instance, as smallpox. The term is chiefly used in connection with smallpox. See VACCINATION.

Inquisition, *in kwi zish'un*, THE, an ecclesiastical court in the Roman Catholic Church, officially known as the Holy Office, for the discovery and suppression of heresy. In the early ages of Christianity, civil as well as ecclesiastical government rigidly opposed all heresy. A person suspected or discovered to be guilty of heresy was liable to be arrested and detained in prison to await trial by the judges. The proceedings were usually conducted secretly. The suspect had the right to make known his enemies, whose evidence would be excluded, but a confession of guilt was sometimes extorted by torture, though such a confession, in order to be accepted, had to be repeated afterwards without torture. As a punishment, those convicted had to make pilgrimages, wear some badge, as the yellow cross, as a mark of disgrace, or be sentenced to imprisonment and, in extreme cases, to death (See HERETIC). The death penalty could, however, be inflicted only by the State and was resorted to in comparatively few cases. Thus, between 1308 and 1322 out of 636 persons convicted of heresy only 40 were condemned to death.

From the time of Constantine the doctrines of the Church were regarded as the basis of social order and the bulwark of thrones. Those who opposed them were therefore regarded as the enemies of both. A ruler was required to enforce the laws of the Church as part of his duty as a Christian. If he refused to do so, he might be excommunicated or even deposed. After the formation of the Nicene Creed, Constantine made strenuous efforts to suppress all dissent from the principles laid down therein. He punished the Donatists with fines and confiscation and caused the books of the Arians to be burned. His successors for several centuries coöperated with the bishops in discovering and punishing heresy. The measures resorted to were usually mild and yet quite effective. In the East, from 385, heresy was legally punishable by death, but this sentence was seldom delivered. In the twelfth and thirteenth centuries, the spread of certain heretical sects—as the Albigenses and Waldenses—roused the Church to a realization of the necessity of increased

vigilance. Finally, a permanent court, confined chiefly to the Dominican order, was instituted, its duty being to deal with this branch of the work of the Church.

In Spain the Inquisition developed into an organization whose work is generally condemned by Protestants and Catholics alike. There are, however, those who are inclined to defend it and who hold that the facts have been grossly misrepresented in history. One concession must in all justice be made—that many of the cases tried by the Spanish Inquisition were not really heresies, but, rather, crimes such as would now be brought into the ordinary civil courts, and the punishments inflicted were probably in many cases just. An ordinary tribunal similar to those of other countries had existed in Spain from an early period. The rulers Ferdinand and Isabella, because of a Jewish plot to overthrow the government, obtained permission from the Pope to reorganize the Inquisition, reserving, however, the right of appointing the inquisitors and of controlling the entire action of the tribunal. In 1480 the Cortes sanctioned the institution, and the best authorities agree that from this time on the Spanish Inquisition became a State tribunal. Its work began in 1481 and was actively conducted until the latter part of the seventeenth century. A conservative estimate places the number of executions at 4000. The popes endeavored to mitigate the rigor of the Spanish court's proceedings, but were unable to accomplish much with the royal tribunal. Finally, in 1808, the Inquisition was suppressed, but under the Restoration it was revived. On the establishment of the Constitution, in 1820, it was again suppressed, but was not finally abolished until 1834.

In Rome and the Papal States the Church never ceased from the time of its establishment to exert a watchful control over heresy, punishing it with imprisonment and civil disabilities, but rarely, if ever, with death. Berger says there is no instance of death for heresy at Rome, and Archbishop Spalding says that it would be difficult to prove such an instance. The Congregation of the Holy Office still exists, but its chief concern now is with the suppression of heretical literature.

Insane Asylum, an institution established for the treatment of insane persons. Many of these are public institutions, under the care of the state or county in which they are located; others are established by charitable persons

and given large endowments, while a third class consists of private institutions, in which patients are kept at fees proportionate to the accommodations and treatment they receive. But whether public or private, such institutions are now under control of the government and are frequently visited by officials, who see that the patients are kindly and properly treated. Formerly, the insane were considered as little better than wild beasts, and the hospitals were places of unmitigated cruelty, but now everything possible is done to make the patient's life pleasant; force is not used except when necessary, and the nurses and attendants are trained in their work. The result of such conditions has been manifest, not only in the increased comfort of the confined patients, but in the large numbers of cures that have been effected, even of cases that were long ago considered hopeless.

Insan'ity, a general term applied to every form of intellectual disorder, whether consisting of a total lack or loss of understanding, as in idiocy, or in the diseased state of one or several of the faculties. Medical writers have adopted different systems of classification, but perhaps the most convenient is that which includes all mental diseases under the four heads of mania, melancholy, dementia and idiocy. *Idiocy* is a defect of the intellectual faculties and may be present from birth or may be acquired by an injury to the brain, or from some other cause. *Dementia* is marked by a confusion of thoughts, loss of memory, childishness, diminution or loss of will power and general weak-mindedness. *Mania* is characterized by the disorder of one or several of the faculties or by blind impulses to acts of fury. *Melancholy*, or *melancholia*, consists in a depression of spirits; the mind is so occupied by dark forebodings that by degrees it becomes unable to judge rightly of existing facts, and the faculties become disturbed in their functions. Sometimes melancholy ceases of itself or is cured by medical aid, and in other instances it progresses to death. Not infrequently the patient is led to suicide.

The causes of insanity are numerous; the most common, as shown by the records of state hospitals for the insane, are loss of friends, business troubles, overwork, religious excitement, alcoholism and a great variety of physical causes arising from disease or vicious habits. There can be no sudden cure of insanity by the use of drugs, and the treatment of cases must vary according to the causes which produced

the malady. It is estimated that more than half of the cases of mania and melancholia recover, though certain other forms are never curable. In most of the states in the Union, provision is made for the cure of insane patients in well-appointed hospitals, where skilled attendants may give each sufferer the best attention. See INSANE ASYLUM.

Insecticides, *in sekt'i sidez*, and **Fungicides**, *fun'jy sidez*, preparations for destroying insects and fungi injurious to plants. The preparations for destroying insects are known as insecticides, and those for destroying fungi as fungicides. Sometimes the same preparation is suitable for both purposes.

INSECTICIDES. Insecticides need to deal with two classes of insects, those that live upon the outside of the plant, such as caterpillars, and those that live by sucking the sap of a plant, such as plant lice; preparations which are suitable for the first class of insects have no effect upon the second. Insects which feed upon the leaves or other plant tissues may be destroyed by some preparation containing arsenic. The most valuable of these are the following:

Arsenic Solution. This is prepared by adding to four ounces of Paris green two pounds of slaked lime and forty gallons of water. This makes a good solution for spraying.

Kedzie Mixture. This is prepared as follows: Boil two pounds of white arsenic with eight pounds of sal-soda (carbonate of soda) in about two gallons of water, until the arsenic is dissolved. Put this solution into a jug and keep it corked. It is a stock solution, to be used as needed. For spraying, slake two pounds of fresh lime. Add this and one pint of stock solution to forty gallons of water and mix thoroughly. The stock solution is intensely poisonous and should be labeled *poison* and kept in a secure place.

Kerosene Emulsion. This is the best mixture for the sucking insects. To prepare it, dissolve two pounds of hard soap in a gallon of boiling soft water, add two gallons of kerosene and mix thoroughly. For a strong solution add to this twenty-seven gallons of water. For a weak solution add forty-five gallons of water.

FUNGICIDES. Fungi can be divided into two classes, those that grow on the outside of a plant and those that grow on the inside and appear on the surface only when full-grown. The fungicide must be adapted to the nature of the growth. The following are the most useful preparations in destroying fungi:

Sulphur. This is a common fungicide of the hothouse. It is used by sprinkling it on a surface sufficiently warm to vaporize it. This deposits the fine sulphur powder or flowers of sulphur on the plants, and when the work is successfully done the results are satisfactory. Care should be taken not to ignite the sulphur, since gases from its burning will destroy the plants as well as the fungi.

Bordeaux Mixture. This is prepared as follows: Dissolve four pounds of copper sulphate (blue vitriol) in four gallons of water, by suspending the sulphate in a bag in the water. Slake four pounds of fresh lime in five gallons of water. Pour these solutions into thirty gallons of water and mix thoroughly. For delicate plants, such as peach trees and those having young foliage, an extra pound of lime and twenty-five gallons more of water should be added.

Copper Carbonate Solution. This is prepared by dissolving an ounce of copper carbonate in one pint of ammonia and adding ten gallons of water to the solution. This solution will not discolor foliage and is nearly as effective as the Bordeaux mixture.

Insecticides and fungicides should be applied with the greatest care. The work is most successful when the application is in the form of a spray. The apparatus required is a force pump and a hose having a nozzle constructed especially for the purpose. The spray should be so fine that it will touch all parts of the plant and moisten them, but will not throw a sufficient quantity of liquid to cause it to run down. In spraying tall trees, as apple trees, ladders are necessary. Plants should be sprayed when the condition indicates that the insect or fungus is making its appearance. These conditions must be determined by the orchardist; but he should observe one very important principle, which is, never spray while the blossoms are on the trees.

In'sectiv'ora, a comparatively unimportant order of Mammalia, none of which are large, and most of which are nocturnal in habit. Usually they walk on the soles of their feet, which, as a rule, have five toes. As the name indicates, they live largely on insects, though this is not exclusively true. See HEDGEHOG; MOLE; SHREW.

In'sects are the most numerous class of animals, belonging with the Crustaceans to the branch next to the vertebrates (See ARTHROPODA). They are called insects because the three divisions of the body, head, thorax and

abdomen, are always distinctly divided one from the other, in which respect they differ from the other classes of their branch. There are usually about eighteen segments, or rings, to each insect, though it is not often possible to see all of them. The head is usually composed of four segments, closely fused together; the thorax, of three segments, and the abdomen, of the remaining ones. There are never more than three pairs of legs in a perfect insect, and these are all borne upon the thorax. Each leg consists of from six to nine joints. Normally, two pairs of wings are present, but one or the other may be wanting. The wings are expansions of the sides of the second and third sections of the thorax and are attached by slender tubes. In the beetles the anterior pair of wings are hardened into protective cases, which cover the membranous posterior wings. The head carries a pair of feelers (See ANTENNAE), a pair of eyes, usually compound, and the appendages of the mouth. The latter are in two typical forms, one intended for chewing, as is shown in the beetle, and the other for suction, as is shown in the butterfly. The abdominal segments move easily one upon another, and at the extremity they are often armed with defensive organs. The insect breathes through pores along the sides of its body, and has a well-developed digestive tract, consisting of gullet, crop, gizzard, stomach and intestine. The colorless or greenish blood runs through the body, but not in a regular system of blood vessels. The sensitive nervous system is composed of a series of knots or ganglia, placed along the lower side of the body and connected by a set of double nerve cords.

Insects are produced from eggs. When these hatch, the little animals usually show no resemblance to the insect that laid the eggs. In this, their first state, they are called caterpillars or worms, or, more accurately still, *larvae*. Of course they are not worms in the sense in which the zoölogist uses that word. They live for some time as larvae, eating heartily and shedding their tough skins whenever they become too confining. When the larva is full-grown, it goes into a quiet, resting state, unlike either caterpillar or perfect insect. In this form it is called a *pupa*, which in some species is enclosed in a silk cocoon (See SILKWORM). After resting a time in this condition, the insect emerges from the pupa as an *imago*, that is, the fully perfected form in which eggs are laid for another cycle of life. These three changes constitute what is

known as a complete metamorphosis. Not all insects pass through these three stages. The grasshopper, for instance, can be recognized as a grasshopper as soon as it comes out of the egg. Insects have been divided into three sections, according as they undergo no metamorphosis, an incomplete one or a complete one.

Insects play a great and important part in the economy of the world, and while some are destructive, others are of great value to mankind. Many are surpassingly beautiful; some show remarkable phases of intelligence, and all are interesting subjects for study. In their infinite numbers, insects are found in nearly every part of the world, feeding upon plants and animals, living and dead; sucking the juices and consuming the tissues, and preying upon almost every conceivable fabric of vegetable or animal origin. To learn more of their appearance and habits, their value or destructiveness, the reader should consult the numerous special articles, such as those on bee, cochineal, silkworm, ant, butterfly, army worm and chinch bug.

CLASSIFICATION. A perfect classification of insects has not yet been established, although there are now generally recognized nineteen independent groups, which have been made from the seven that constituted the classification of Linnaeus. The latter is still used to so great an extent that it is given here:

I. The *Neuroptera*, an order that has been broken up by the newer classification into ten different families, three of which are placed much higher in the list. Dragon flies are good examples of the *Neuroptera*. See NEUROPTERA.

II. The *Orthoptera*, divided by later entomologists into two families, have four wings, the hinder ones being flattened lengthwise and laid straight along the body when the insect is not flying. Crickets, cockroaches and grasshoppers are good examples. See ORTHOPTERA.

III. The *Hemiptera*, now considered to be composed of two families, have four wings or none at all. All this class have their mouths armed for piercing and sucking the juice of plants or blood of animals. See HEMIPTERA.

IV. The *Coleoptera* are the beetles. They have four wings, the outer pair being hardened, apparently for protection. See BEETLE.

V. The *Diptera* are the two-winged insects. Entomologists now make two families of this order. See FLY; MOSQUITO.

VI. The *Lepidoptera* are the moths and

butterflies. Their wings are covered with minute hairs or scales, and their mouths are adapted to sucking. Their larvae are generally injurious to vegetation. See ARMY WORM; BUTTERFLY; MOTH.

VII. The *Hymenoptera* are the gauze-winged insects. The mouth is formed for biting and sucking, and the abdomen of the female is usually armed with a sting or saw. See ANT; BEE. Consult Howard's *The Insect Book*; Comstock's *Manual for the Study of Insects*, and Packard's *Guide to the Study of Insects*.

Insig'nia, distinguishing marks of authority, office or honor, such as the crown and scepter of a king, the shield and helmet of a knight, the banner of a warrior and the tiara and ring of a pope. Typical and characteristic signs by which the members of any trade, profession or society, or of any civil, military or religious order are distinguished, are also known as its insignia. Of especial importance are the military insignia, which are badges or devices to distinguish the various corps, arms, ranks and grades of military and naval service.

EARLY MILITARY INSIGNIA. Strictly speaking, the use of the military insignia dates back to ancient times, when troops were distinguished by the devices on their banners and shields; but in the modern accepted sense of the term the military insignia include only the characteristic devices on the uniforms. Such devices, so far as is known, were first used in the Second Crusade, when, to avoid confusion, the French wore a red cross and the English a white cross on the sleeve.

MODERN EUROPEAN MILITARY INSIGNIA. In modern armies insignia play an important part. In Europe the badges, mottoes and devices used by the various regiments are usually emblematic of conspicuous incidents in their history; for example, in England the sphinx of Egypt is worn by the thirty regiments which served in the first English expedition against the French in Egypt. The German usage of insignia may be considered typical of all European countries. Throughout the army the commissioned officers wear crescent-shaped epaulets. Those of the general, field marshal, general in chief, lieutenant general and major general are distinguished by silver rims and silver trimmings, while non-commissioned ranks are distinguished by gold or silver leaf on the collar, cuffs, and facings of the tunic. The soldier's number and the monogram of his regiment are on his shoulder straps. On the right side of every soldier's

helmet is the white, black and red cockade of the German Empire, while the cockade on the left side indicates the particular state to which the regiment belongs; for example, a Prussian soldier wears a black and white cockade, while a Saxon wears one of white and green.

UNITED STATES MILITARY INSIGNIA. In the United States at the time of the Revolution, the distinguishing marks of army ranks were largely copied after those of other countries. Up to the time of the Civil War, changes were frequent, but since that time the insignia have remained substantially the same. The insignia of officers of the *United States Army* are as follows:

1. *Insignia worn by all officers.* The coat of arms of the United States and the letter V, signifying "Volunteers," made of gold or gilt metal or dull-finished bronze and worn on the collar of the dress, service or white coat.

2. *Insignia of the various corps, departments or arms of the service.* The design for the cavalry consists of two crossed sabers with the regiment number above the intersection; for the artillery, two crossed cannons with a scarlet-centered oval at the intersection; for the infantry, two crossed rifles with the regiment number above the intersection; for the adjutant general's department, a shield of gold or gilt metal, and for the various other departments, similar characteristic devices. These insignia are worn upon the collar of the coat.

3. *Insignia of rank.* The rank of commissioned officers is indicated by a device embroidered in silver or gold on the shoulder strap of the dress uniform and by the same design on the shoulder and elbows of the service coat. Rank is also indicated by ornamentations on the sleeve. For the general and lieutenant general, these may be such as they prescribe. For other general officers this decoration is a band of oak leaves, embroidered in gold, surmounted by two silver stars for the major general and one silver star for a brigadier general. For general officers of the staff departments, the proper insignia are placed one inch above the velvet cuff, and the stars, as before, one inch above the insignia. For the colonel, the ornamentation consists of a single knot of five strands of gold wire braid, applied to the sleeve of a full dress coat below the elbow; for the lieutenant colonel, four strands of this braid; for the major, three strands; for the captain, two; for the first lieutenant, one. The insignia of the corps, department or arm of the service consist

of gold or silver metal or embroidery and are placed in the center of the open space under the braid insignia. Braid insignia for overcoats, made of flat black mohair braid, follow the form of the gold braid insignia for dress coats.

The rank of non-commissioned officers and of enlisted men is indicated by chevrons on the coat and stripes on the trousers. The chevrons and stripes are of a color corresponding with the facings of the uniform. Attached to the front of the cap of the non-commissioned officers and enlisted men are insignia of yellow metal, consisting of a design emblematic of the corps, department or arm of the service, the number of the regiment and the letter of the troop of the wearer. The collar is ornamented by a metal design similar to that of an officer, but with the letters U. S. substituted for the coat of arms. Gold badges worn on the hat or cap were first employed during the Civil War and have proved to be extremely valuable for identification. Commissioned officers wear them on the left breast of the coat.

In the *United States Navy* the following insignia are worn:

1. *Insignia of all naval officers and cadets.* Attached to the front of the cap is a device consisting of a silver shield divided by thirteen upright stripes and with its chief, or upper part, strewn with stars, surmounted by a silver spread eagle, the whole placed upon two crossed anchors in gold.

2. *Insignia of rank.* Rank is indicated by the strips of lace or braid on the sleeve and by the devices on the collar, shoulder marks, shoulder straps and epaulets. The sleeve of an admiral has two strips of two-inch gold lace, with one strip of one-inch gold lace between; a rear admiral, one strip of two-inch gold lace, with one strip of half-inch gold lace above it; a captain, four strips of half-inch gold lace; a commander, three strips of half-inch gold lace; a lieutenant commander, two strips of half-inch gold lace, with one strip of quarter-inch gold lace between; a lieutenant, two strips of half-inch gold lace; a lieutenant (junior grade), one strip of half-inch gold lace, with one strip of quarter-inch gold lace above; an ensign, one strip of half-inch gold lace; staff officers, the same as for line officers with whom they rank, except that bands of colored cloth are placed between the strips of lace; naval cadet, one strip of quarter-inch gold lace; chaplain, lustrous black braid of the same size and disposition as for line officers of the same rank. The

device on the collar, shoulder marks and epaulets is the same for each rank as that on the shoulder straps. See **UNIFORM**.

Insol'vency, in law, the status of any person who is unable to pay his debts. In the United States the term is used commonly in distinction to bankruptcy, an insolvent person being unable to pay all of his debts and a bankrupt person being unable to pay any considerable part of them. Insolvency and bankruptcy are both regulated by both Federal and state laws, of which the latest was the Federal statute of 1898. See **BANKRUPT**.

Insom'nia or **Sleeplessness**, a condition caused by excitement, exhaustion, intoxication, grief or any other emotional disorder. The best treatment consists in removing the cause, and change of environment, frequent rests, plenty of fresh air, hot baths and massage are often helpful. See **SLEEP**.

Inspiration, *in'spir a'shun*, in theology, the infusion of ideas into the human mind by the Holy Spirit. By the inspiration of the Scriptures is meant the influence of the Holy Spirit exercised on the understanding, imagination, memory and other mental faculties of the writers, by means of which they were qualified for communicating to the world divine revelation, or the knowledge of the will of God.

In'stinct, the innate power which compels an animal to perform certain acts without having a knowledge of the purpose of the act or without a conscious connection between the act and its purpose. In the lowest animals, such as mollusks and worms, instinct is nothing more than reflex action. In the higher animals, as birds and most mammals, it verges so closely upon intelligence that it is difficult to find a dividing line between them. Instincts are closely related to the preservation of the individual, as the instinct of taking food, common to all young animals, and the instinct of fleeing from danger, or of reproduction, as in nest-building and the sitting of the bird to hatch the eggs. It is also closely allied with the feelings. Undoubtedly, laughter, weeping, anger and some other emotions are instinctive.

Instinct differs from intelligence in that it does not gain by experience. The robin builds its first nest as well as its fifth, and the young eagle seizes its prey as skilfully as the old one. Among the higher animals there are some apparent exceptions to this rule. An old fox is liable to be more cunning than a young one, and the dog and horse undoubtedly gain in

intelligence as they gain in years. Some instincts are destroyed by removing for several generations the necessity for them. Canary birds that have been reared in a cage from one generation to another lose the nesting instinct. Man is guided by intelligence rather than instinct, but he is subject to some instinctive movements, such as the taking of food by the infant and certain inherent mental tendencies. These are usually due to heredity and can be suppressed or modified by training.

In'stitute of France, a name given to several learned societies united into one body under the patronage of the French government. At present these societies are the following:

(1) The French Academy, organized by Cardinal Richelieu in 1635, devoted to literature. Its members are often called the *Forty Immortals*. They have in their hands the distribution of many valuable prizes for literary excellence.

(2) The Academy of Inscriptions, founded in 1663, devoted to the study of antiquities, inscriptions and ancient and oriental languages.

(3) The Academy of Sciences, founded in 1666, for the promotion of mathematics, physics, astronomy and other sciences.

(4) The Academy of Fine Arts, founded in 1648, devoted to music, painting, sculpture and architecture.

(5) The Academy of Moral and Political Science, founded in 1795, suppressed in 1803, but restored in 1832, given to the discussion of psychology, history, finance, law and political economy.

Each has a fostering care over some art or science, and promotes its interests by prizes for excellence and in other ways. Members receive a small salary. Each Academy has its own officers and its own funds, while the collections and libraries are in common. The general fund is in charge of a committee of two from each Academy, acting with the minister of public education as chairman.

In'stitu'tional Church, a name given to a church or organization which emphasizes activity and actual accomplishments in social and individual progress, mentally, physically and morally, as well as spiritually, in distinction to the ritualistic church, which lays emphasis upon beliefs, forms and sacraments. Since 1890 the development of institutional church work in the United States has been very rapid, being promoted by the same influences which led to the extension of university settlements, the Salvation Army and similar philanthropic

enterprises—namely, the belief that the churches were not accomplishing their mission with the masses of the people. An institutional church is usually managed through a highly specialized committee system. It calls for the personal effort of the laity of the church, as well as of the leaders, and it extends its activities to include educational, social and physical work, as well as religious. Lectures, classes, clubs, libraries, games, gymnasiums, natatoriums, athletics, employment bureaus, dispensaries and hospitals are all adjuncts of the modern institutional church. Probably the most famous of the institutional churches of the United States are the Berkeley Temple of Boston, the Judson Memorial of New York, the People's Palace of Jersey City, the Plymouth Church of Indianapolis, the Tabernacle of Denver and All Souls' Church, or Lincoln Center, of Chicago. These and many others are organized into an Open and Institutional Church League, which had its beginning in New York in 1894.

In'strumen'tal Music, music produced by instruments, as distinguished from *vocal music* (See SINGING). The art of arranging the parts of a composition for orchestra is known as *instrumentation*. It is of rather recent origin, even Bach and Handel having but primitive ideas upon the subject. The importance of a thorough knowledge of instrumentation is manifest, for a chord which, sounded by some instruments, would produce exquisite harmony, sounded by others would be discordant. The greatest masters of instrumentation have been Haydn, Mozart, Beethoven, Weber and Wagner. The art is also called *orchestration*. See ORCHESTRA.

In'sula'tor, a body which is used to separate an electrified conductor from other bodies, and which offers great resistance to the passage of electricity. Glass, shellac, resins, sulphur, ebonite, gutta-percha, silk and baked wood are notable insulating materials. A glass cone is the usual form of insulators in telegraph lines, being used at the points where the wires are supported on the posts. Insulators for this purpose are also made of porcelain (See ELECTRICITY).

Insurance, in *shoo'ans*, in law, "a contract by which one party, for an agreed consideration (which is proportional to the risk involved), undertakes to compensate the other for loss on a specified thing, from specified causes. The party agreeing to make the compensation is usually called the *insurer* or *underwriter*; the other, the *insured* or *assured*; the agreed con-

sideration, the *premium*; the written contract, a *policy*; the events insured against, *risks* or *perils*, and the subject, right or interest to be protected, the *insurable interest*." If the risk is fire, the system of insurance is known as *fire insurance*; if the risk is connected with navigation by sea, the insurance is known as *marine insurance*; if it is accident of any kind, explosion, breakage, destruction or the loss of future earnings, it is *accident insurance*; if the event is death, the insurance is called *life insurance*.

Insurance companies are of two kinds, *proprietary* or *stock* companies, which have a certain capital stock and which establish such rates or premiums as not only will cover expected losses, but will provide a reasonable profit or interest upon the capital invested; and *mutual* companies, in which the policy-holders are also the stockholders, and the rates or premiums are fixed at just that amount which will pay for the losses to be incurred and for the management of the company, the profits, if any, being returned to the policy-holders in dividends. Familiar examples of this kind of insurance companies are the so-called "friendly societies" or "fraternal societies," such as the Odd Fellows or the Modern Woodmen of America. Some of the largest insurance companies in the world, however, besides the fraternal societies, are also organized on this basis.

FIRE INSURANCE. In fire insurance the contract by which insurance is undertaken establishes certain rights and duties upon each party. These are usually expressed in the policy, but sometimes are only implied, but in either case will be recognized in court. The underwriter promises to indemnify the insured to a certain specified extent, and thereby guarantees that the insurance company will endure as long as the contract of insurance runs; that the risks which it undertakes shall be selected with careful regard to quality, quantity and exposure; that the premiums charged shall be adequate to afford a profit which shall make the insurance doubly secure, and that its funds shall be guarded against wasteful or dishonest expenditure or investment. The insured, in signing his application, answers a series of questions, and if at the time of loss it can be shown that he has misrepresented or untruthfully answered any of these questions he is entitled to no indemnity. It is customary for insurance companies to classify the risks against which they insure in certain orders, known as ordinary, hazardous and extra-hazardous, the rates

charged being apportioned accordingly. It is especially important that the insured state truly the class under which his property should fall. Repairs and alterations on the premises insured, if they do not affect the character of the risk, do not invalidate the policy, but the insurance companies should usually be notified of such changes. Courts generally are inclined to construe insurance policies liberally on behalf of the insured, and unless fraud can be shown, damage resulting from fire, even though due in part, and in some cases in whole, to the negligence of the insured or his servants, must be indemnified by the insurance company. It is customary for insurers to stipulate that they may rebuild or repair the premises if they choose, instead of paying for the loss. It has recently become the rule in both England and America that heat alone does not create liability on the part of the insurers unless there be actual fire; so a loss by lightning is not held to be a loss by fire unless the property be destroyed by flames occasioned by the lightning. On the other hand, loss occasioned by direct efforts to put out a fire, as by water, or a loss sustained by removing insured goods from the peril of fire or of tearing down or blowing up a structure to stop the progress of a conflagration, would fall on the insurers, provided the steps taken were reasonable and necessary. Marine insurance is largely governed by the same principles as fire insurance, with such modifications as the nature of the property and of the risks necessitates. The same is true in regard to accident insurance.

LIFE INSURANCE. Life insurance originated in the desire of a man to provide for a helpless or dependent family after his death. It has now, however, entered the field of investment, and policies are written whose main object is the safe-keeping and increase of funds. Three classes of policies are most common in the United States, those known as *life*, or *straight life*, policies, *endowment* policies and *tontine* policies. Each of these classes has been varied in innumerable ways, in order to meet the demands of different classes of persons. For instance, in taking out a life policy the person may agree to pay a certain amount annually as long as he lives, the company agreeing to pay a certain amount at his death to his heirs or to some specified beneficiary. He may make annual payments for a term of years, as ten, fifteen or twenty, and then pay no more, the company promising that at his death a certain amount

shall be paid to his heirs or beneficiaries. Or he may pay a certain amount once for all, with the understanding that at his death a certain amount will be paid to his heirs or beneficiaries. In the endowment policy the insurance company agrees to pay at the end of a certain term if the insured is alive, or before that, in case of his death, a certain amount. In both classes of policies the premiums are determined on the same basis, that is, the insured pays enough each year to the company, so that at the end of the given time the accumulation of his premiums and of a low rate of interest upon them will equal a certain amount, which the insurance company then agrees to pay to his beneficiaries. Life insurance upon either of these plans is therefore exactly opposite to the principle governing the payment of annuities (See ANNUITY). The premium to be paid either upon life policies or upon an endowment policy is regulated in accordance with a mortality or insurance table, compiled from the experience of many companies in accordance with the law of probabilities and the law of averages (See MORTALITY, LAW OF). In accordance with this table the company can determine approximately what proportion of persons insured at a given age will die each year until the whole number have died, that is, they can determine the average number of years that persons at a given age will live. Therefore, if the company agrees to pay a certain amount at a certain person's death, it will fix the premium which that person shall pay annually until his death at such an amount that if he died at the time that the average person of his age will die, he will have paid to the company enough, with the accrued interest, to equal the sum which his beneficiary will receive. The tontine policy differs from both of these, and may be of either of two kinds. According to one system, if the insured allows his policy to lapse, he forfeits whatever he has paid in, the profits on his investment accruing to the others of the same class. By the later, or *semi-tontine*, plan, certain extraordinary profits, not taken into consideration at the time of the writing of the policy, are allowed to accumulate throughout the term of the policy, ten, fifteen or twenty years, and at that time are divided among the persons of the same class whose policies are still in force.

HISTORY. Insurance is many centuries old, being recognized in English statutes as early as 1600. Its oldest form is marine insurance; its latest, fidelity insurance, that is, insuring an

employer against the defalcation of his employé, or burglary insurance, against robbery. In recent years, the vast growth in the power and influence of insurance companies, through the concentration of funds in their hands, has led to searching investigations of their methods, and this, in turn, to more rigid governmental control over their activities.

Interest, in political economy, the increase of capital used in production; in common speech, the allowance made for the loan or retention of a sum of money which is lent for, or becomes due at, a certain time, this allowance being generally estimated by per cent per annum, that is, by the year. The money lent is called the *principal*; the ratio of the interest for one year to the principal is the *rate*, and the sum of any principal and its interest together is the *amount*. Interest is either simple or compound. *Simple interest* is that which is allowed upon the principal only, for the whole time of the loan. *Compound interest* is that which arises from increasing the principal at fixed periods by the interest then due, and from that time forward till the end of the next period, obtaining interest upon this amount. The ordinary rate of interest, supposing the security for the principal to be equal, depends obviously upon what may be made on the average by the employment of money in various industrial undertakings.

Interest, in psychology, the feeling of satisfaction or dissatisfaction which one has towards a subject, or that bent of mind which causes one to contemplate certain subjects with pleasure and to have an aversion for others. Interest is a phase of feeling and differs from desire in that in interest the mind is satisfied with contemplating the subject, while desire is not satisfied until possession is obtained. Interest may be pleasurable or painful, according to the nature of the subject by which it is aroused. Contemplation of the same subject may be painful to one and pleasurable to another. In contemplating a surgical operation which a friend must undergo, one may be sorrowful because of the pain and risk that the patient must suffer, while the surgeon, contemplating the same operation, derives pleasure from considering the skill which makes the operation and its consequent benefits possible.

Interest is the foundation of knowledge, since without it prolonged attention is impossible. The child voluntarily directs his attention only to those things which he feels can supply his wants,

and it is from these that he gains his early store of knowledge. He is interested in whatever supplies his bodily needs, appeals to his love of the beautiful and satisfies his affections. Interest is most easily aroused in those objects of which we have some knowledge. Mere novelty, as a strange sound or an unusual color, will attract the child for a moment; but it does not serve to hold his attention, because he is unable to place it satisfactorily in his store of ideas, while a color that he has before seen, a tone with which he is familiar, appeal to him because of their association with the ideas already in the mind. This principle should be borne in mind in selecting subjects upon which to give instruction to children in primary grades. The theory that children will be interested in any subject if it is properly presented is fallacious, because there are many subjects which are of such nature that they cannot appeal to the immature mind of the child.

Interest is closely related to volition, and children's activities are largely directed by their interests. All children take interest in something. "The most careless and inattentive boy in school is not without interest, not even without attention. The trouble is he is interested in wrong things." Parents and teachers can do much in directing the child's interest by seeing that he is surrounded by proper associations. See, in the order named, ATTENTION; PERCEPTION; APPERCEPTION; WILL.

Inte'rior, DEPARTMENT OF THE, one of the nine executive departments of the United States government, organized by act of Congress in 1849. It is under the direction of a secretary of the interior, who is a member of the president's cabinet, being seventh in line of succession to the presidency. The department has supervision of indian affairs, public lands, pensions, patents, the geological survey, education, public documents, railways subsidized by the Federal government, territories, national parks and reservations and certain institutions in the District of Columbia. Each of these bureaus is presided over by a commissioner, appointed by the president and confirmed by the Senate, but responsible to the head of the department. See UNITED STATES, subhead Government.

In'terjec'tion, in grammar, the part of speech used to express sudden, strong feeling.

Interlaken, *in'tur lah'ken*, a village in Switzerland, 26 mi. s. e. of Berne, beautifully situated near the left bank of the Aar, between the lakes

of Thun and Brienz. Its beautiful scenery and healthful climate make it a popular resort.

Intermezzo, *in'tur met'so*, in dramatic literature, a short musical piece, generally of a light, sparkling character, played between the parts of a more important work, such as an opera or drama. Pieces intended for independent performance are sometimes designated by this name.

Internal Rev'enue System. See EXCISE TAX.

International Date Line, an irregular imaginary line, drawn through the Pacific Ocean in the vicinity of the meridian 180° of longitude, to mark the place where navigators in crossing the Pacific change their dates. If a person is traveling westward, for every fifteen degrees of longitude which he travels, the length of his day is increased by one hour, since he is traveling with the sun. In going the whole distance around the earth westwardly, he will lose one day; that is, upon arriving at the starting point, Sunday, according to his reckoning, will be Monday to those who have remained there during his absence. If he should travel around the earth in the opposite direction he will gain one day. Therefore, if two persons starting from the same place travel around the earth in opposite directions, when they meet at the place of starting, they will differ by two days in their reckoning of time. Hence the necessity for having a *date line*, at which ships passing in both directions change their dates in order to come into agreement with each other. The meridian of 180° of longitude is chosen for this purpose because it is at the farthest possible distance from civilization and a change at that point will therefore cause the least inconvenience. The date line, however, does not coincide exactly with this meridian, since it is drawn so as to avoid a change between important islands of the same group. In fact the line is not drawn exactly the same by different map makers.

International Law, the law of nations; those rules or maxims which independent political societies or states observe, or ought to observe, in their conduct toward one another. International law is divisible into two parts, that which regulates the rights, intercourse and obligations of nations, as such, with one another; and that which regulates the rights and obligations more immediately belonging to their respective subjects. Thus, the rights and duties of ambassadors belong to that head which respects the nation in its sovereign capac-

ity; and the rights of the subjects of one nation to property situated within the territory of another nation, belong to the latter head. Some of the maxims regarding the rights and duties of nations during a state of peace are: (1) Every nation is bound to abstain from all interference with the domains of other nations. (2) All nations have equal and common rights on the high seas, and they are not bound to admit any superiority there. The sea which washes the coast of a nation is, to the extent of three miles from shore, now deemed to be a part of the territory of the nation, over which it may exercise an exclusive jurisdiction. And, in respect to persons subjected to its laws, every nation now claims a right to exercise jurisdiction on the high seas, for the purpose of enforcing both international law and its own municipal regulations. (3) No nation has a right to pursue any criminal or fugitive from justice in a foreign country; its claim, if any, is a mere right to demand him from the nation in which he has taken refuge. (4) Every nation has a right to regulate its own intercourse and commerce with other nations. (5) Foreigners are bound to obey the laws of a country as long as they reside within it and under its protection; and the property held by foreigners within a country ought to be protected in the same manner as that of natives. (6) Every nation has a right to send and to receive ambassadors and other public ministers; the persons of such ministers are held sacred and inviolable, and their property, servants and retinue enjoy a like privilege.

War introduces an entirely new order of rules. The right of declaring war results from the right of a nation to preserve its own existence, its own liberties and its own essential interests. In a state of nature men have a right to employ force in self-defense, and when they enter into society this right is transferred to the government and is an incident to sovereignty. What are just causes for entering into a war is a question which has been much discussed by publicists. Defensive wars are necessarily justifiable, from the fact that they involve the existence or safety of the nation and its interests. But offensive wars are of a very different character and can be justified only in cases of aggravated wrongs or vital injuries. The first effect of a declaration of war is to put the subjects of one nation into a state of hostility to those of the other nation. The property belonging to one is deemed hostile by the other. If it be personal property it may be captured as a prize; if lands, they may

be seized and confiscated at the pleasure of the sovereign; if it be merely in debts or stock it may, in the extreme exercise of the laws of war, be equally liable to confiscation. As soon as a battle is over, the conquerors are bound to treat the wounded with kindness and the prisoners with a decent humanity. And there are some things which seem positively prohibited, from their cruelty and brutal barbarity; such are the torturing of prisoners, the poisoning of wells, the use of inhuman instruments of war. In time of war there is occasionally intercourse between the belligerents, which should be held sacred. Such intercourse includes the interchange of prisoners, the temporary suspension of hostilities, the passage of flags of truce, the engaging in treaties of capitulation. When any conquest of territory is made, the inhabitants pass under the dominion of the conqueror and are subject to such laws as he chooses to impose upon them. There are also certain rights which war confers on the belligerents in respect to neutrals. Thus, they have a right to blockade the ports or besiege the cities of their enemies and to interdict all trade by neutrals with them. But no blockade is to be recognized unless "the besieging force can apply its power to every point in the blockaded state." Belligerents have a right also to insist that neutrals shall conduct themselves with good faith and abstain from all interference in the contest by supplying their enemy with things contraband of war. And hence arises the incidental right of search of ships on the high seas for the detection of contraband goods. A neutral nation is bound to observe entire impartiality between the belligerents. Neutral nations are, strictly speaking, bound to compel their subjects to abstain from every interference in the war, as by carrying contraband goods, serving in the hostile army or furnishing supplies. Subject to the exceptions above referred to, a neutral has a right to insist upon carrying on its ordinary commerce with each of the belligerents in the same manner as in times of peace. See TREATY; WAR; NEUTRALITY.

International Peace Conference. See PEACE CONFERENCE, INTERNATIONAL.

Interstate Commerce Act, a popular name for a law passed by the United States Congress in 1887 to regulate commerce between the states. It grew out of the rapid development of railways and the abuses which arose from their sharp competition. Under the law all common carriers, either by rail or water, are

prohibited from granting unreasonable preferences to individuals or localities; from agreeing to pool the traffic (See TRUSTS) and to divide the profits; from concealing any rates, or from changing them without due notice. A commission of five members was created to hear complaints, make investigations of violations of the law and require reports from carriers. The law has accomplished much good in making public the policies of the railways, and in correcting some abuses, but it has failed to accomplish all the good desired, and a serious agitation in favor of an increase of the power of this commission resulted, in 1906, in the passage of a law giving to the commission the right to set aside unreasonable rates and to declare what is a reasonable rate, after consideration of all the circumstances and conditions.

Intestacy, *in tes'ta sy*, in law, the condition of a person who dies without having left any will, or who leaves one not legally valid or such a one that nobody becomes heir under it. In that case the property is disposed of according to a rule fixed by law. In the case of a person dying partially intestate, that is, without disposing of *all* his property, the property not included in the settlement goes to the next of kin or to the heir-at-law, according as it is real or personal. See WILL; PERSONAL PROPERTY; REAL PROPERTY.

Intes'tines, the name given to the membranous tubes which receive the food from the stomach through the pyloric orifice, retain it for a longer or shorter time, mix it with the bile, pancreatic juice and intestinal secretions and give rise to the lacteal or absorbent vessels which take up the chyle and convey it into the current of the blood. The small intestine includes the duodenum, jejunum and ileum and averages about 23 feet in length. The large intestine includes the colon, caecum and rectum and extends nearly around the small intestine. The vermiform appendix is attached to the caecum. The four coats of the intestine are serous, muscular, areolar or submucous, and mucous, the latter in the small intestine being covered with tiny projections, called villi, each of which contains a lacteal, a vein and an artery. This coat is also laid in numerous folds, which serve to delay the food in its passage, to give a large surface for secretion and absorption and to mingle the food lying between them with the secretions. The large intestine contains no villi in the mucous coat. See LACTEALS.

Intox'ica'tion, the state produced by the excessive use of alcoholic liquids and also of opium, chloral or belladonna. In the first stage the circulation of the blood becomes somewhat more rapid, and all the functions of the body and the mind are exercised with more freedom. In the second stage the effect on the brain is more decided. The peculiarities of character and the faults of temperament manifest themselves without reserve; the secret thoughts are disclosed, and the sense of propriety is lost. In the next stage consciousness is still more weakened; the ideas lose their connection; dizziness, double vision and other discomforts arise, until, finally, the excitement partakes of the nature of delirium and is followed by a more or less prolonged stupor, often by dangerous coma. In cases of extreme intoxication the stomach-pump should be employed, if ordinary emetics fail to overcome the inactivity of the stomach.

Invalides, *aN va leed'*, HOTEL DES, a splendid hospital for disabled soldiers at Paris, in the suburb of Saint Germain, erected by Louis XIV, between 1670 and 1673. A soldier must have served ten years to be received into this hospital on account of poverty or infirmity. In vaults under the dome lie the bodies of Napoleon I, Turenne and several other great French commanders.

Inverness', a town in Scotland, capital of the county of the same name, the chief town in the Highlands. The principal buildings are the cathedral, the Royal Academy, the county hall and an infirmary. The industries include ship-building, rope making, tanning, distilling and brewing, and there is a considerable trade, the city having regular communication by sea and canal with Glasgow, Liverpool, Aberdeen and Leith. The city is very old and was once the capital of the Pictish kingdom. Population in 1901, 21,193.

Inver'tebra'ta, a collective term for the six great lower divisions of the animal kingdom, all of which agree in not having a vertebral column, or backbone. It was a term used by Cuvier to include the divisions Radiata, Articulata and Mollusca, which, however, have been changed in the more recent classification. See ZOOLOGY.

Inves'titure, in the feudal law, the open delivery of a fee (See FEE) or fief by a lord to his vassal, thus, by external proof, affording evidence of possession; or the formal introduction of a person into some office or dignity. Investiture was often performed by the presentation of some symbol to the person invested, as a branch of a tree. The investiture of persons with eccle-

siastical offices or dignities is historically the most important phase of the institution. The estates and honors which gave the Church its temporal influence were considered to partake of the nature of fiefs and therefore to require investments from the lord. In the time of Emperor Henry IV of the Holy Roman Empire, a bitter struggle broke out between the Church and the Empire, the former declaring that a temporal prince could not invest an ecclesiastical officer. The contest ended in 1122, at the Concordat of Worms, in a compromise.

Involution. See POWER, in mathematics.

I'o, in Greek mythology, the daughter of Inachus, beloved by Jupiter, who, to protect her from the jealousy of Juno, changed her into a beautiful white heifer. She was given into the care of the hundred-eyed Argus, from whom she was rescued by Mercury.

Iodine, *i'o din* or *i'o deen*, a peculiar elementary solid substance, which exists in the water of the ocean and mineral springs, in marine mollusks and in seaweeds, from the ashes of which it is chiefly procured. It exists in certain plants and minerals and is found in the water of some rivers. The chief commercial source is from kelp, and Glasgow and the west coast of Scotland produce the largest quantities. At the ordinary temperature of the atmosphere iodine is a solid crystalline body. Its vapor is of an exceedingly rich violet color, a character to which it owes its name. Iodine has an extremely acrid taste, and its odor resembles that of chlorine. It is an irritant poison, but in small doses it has been of great service in certain forms of glandular disease. It is largely used in photography, in the preparation of aniline colors and in other ways. The great consumption of iodine is in medicine, where it is sometimes employed in its pure state, but much more frequently in the form of compounds, such as iodide of potassium, which has been found of great benefit in goiter, scrofula, rheumatism and other diseases, as well as in cases of lead poisoning. Iodine is not usually given internally, but as a disinfectant and destroyer of parasites it is freely used externally. It belongs to the halogen group of elements.

Iod'iform, a substance similar to chloroform in composition, except that iodine occupies the place of chlorine. It is in the form of small, solid, yellow crystals and is prepared by the action of alcohol and other bodies on iodine and potash. It is nearly insoluble in water, but it dissolves in ether, oils and alcohol. It is used

in medicine as an antiseptic and has some power to deaden pain. It is successfully applied to ulcers and sores of various kinds and is used as a snuff for cold in the head, but its disagreeable odor prevents its general use except when really necessary. It may be prepared as an ointment.

Io'la, KAN., the county-seat of Allen co., 110 mi. s. w. of Kansas City, on the Neosho River and on the Missouri Pacific, the Atchison, Topeka & Santa Fé and other railroads. The city has a large wholesale trade in grain and groceries with the surrounding country. The industries include cement works, foundries and machine shops and large zinc smelters and rolling mills. The place was settled in 1857, was chartered as a city in 1898 and has been growing very rapidly since the recent discovery of an abundance of natural gas. Population in 1905, 10,287.

Io'nia, that part of the seaboard of Asia Minor which was inhabited by Ionian Greeks, a beautiful and fertile country opposite the islands of Samos and Chios, which also belonged to it. According to tradition the Greek colonists came over from Attica about the middle of the eleventh century B. C. and founded twelve towns, which, though mutually independent, formed a confederacy for common purposes. Commerce, navigation and agriculture early rendered them wealthy and flourishing, but the country was made tributary by Croesus, king of Lydia, and later by Cyrus, king of Persia. With an interval of independence the cities remained under Persia until this empire was overthrown by Alexander the Great, when they became a part of the Macedonian Empire. Ionia, at a later period, became part of the Roman province of Asia. It was afterward totally devastated by the Saracens, so that few vestiges of its ancient civilization remain.

Ionia, MICH., the county-seat of Ionia co., 34 mi. e. of Grand Rapids, on the Grand River and on the Grand Trunk and the Pere Marquette railroads. The city is in the southern and agricultural section of the state, has lumbering interests and contains wagon works, car shops and manufactories of clothing and other articles. The state house of correction and a state asylum are located here. The place was laid out in 1833 and was incorporated in 1873. Population in 1904, 5222.

Io'nian Islands, a number of Greek islands in the Ionian Sea, extending along the western and southern shores of Greece, of which the largest are Corfu, Cephalonia, Zante, Leucas and Cerigo, others being Ithaca, Paxos and Santa Maura. The surface is mountainous, but there

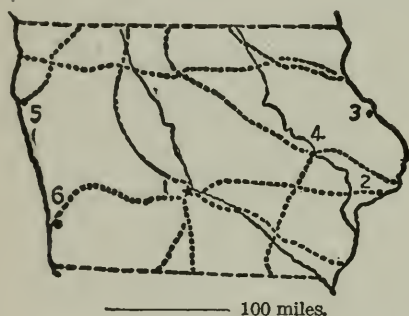
are fertile plains in some of the islands. The staple exports are oil, currants, valonia, wine, soap and salt, and the few manufactures are chiefly textile and ornamental. These islands belonged to Venice from the Middle Ages to the nineteenth century, and in 1814 they came under the protection of Great Britain. They were annexed to Greece in 1864. Population, 252,937.

Ionians. See GREECE; IONIA.

Ionian Sea, the ancient name of that part of the Mediterranean which lies between the south part of Italy and Greece.

Ion'ic Order. See COLUMN.

Iowa, the HAWKEYE STATE, one of the central states, bounded on the n. by Minnesota, on the e. by Wisconsin and Illinois, on the s. by Missouri and on the west by Nebraska and South Dakota. The eastern boundary is formed



1, Des Moines; 2, Davenport; 3, Dubuque; 4, Cedar Rapids; 5, Sioux City; 6, Council Bluffs. Dotted lines indicate chief railroads.

by the Mississippi River, and the western, by the Big Sioux and the Missouri. The length of the state from north to south is 200 miles, its average length from east to west is about 300 miles and the area is 56,025 square miles. Population in 1905, 2,210,050.

SURFACE AND DRAINAGE. The surface of nearly the entire state is what is generally known as rolling prairie, consisting of long, low swells, separated by broad, shallow valleys. About three-fourths of the state slopes gently to the southeast. The average elevation is about 1100 feet, the highest point being in the northwest corner, with an altitude of 1700 feet, and the lowest point in the southwest corner, which has an altitude of about 500 feet. The rivers have broad valleys which are bordered by lines of bluffs. In the northern part of the state there are occasional hills which rise above the general surface.

The Des Moines is the largest river and flows across the central part of the state in a southeasterly direction. About two-thirds of the state is drained into the Mississippi, and aside from the Des Moines the streams of importance in this drainage area are the Turkey, the Wapsipinicon, the Cedar, the Iowa and the Skunk. The portion of the state drained into the Missouri is watered by the Big Sioux, the Little Sioux, the Nodaway and the Nishnabotna. The northwestern counties are a portion of the lake region of Minnesota and contain a number of lakes noted for the beauty of their scenery and their clear water. The most important of these are Spirit Lake, East and West Okoboji, Clear Lake and Storm Lake. There are smaller lakes in Sac, Calhoun and other counties.

CLIMATE. Iowa has a cool temperate climate, with a wide range of temperature between the extremes of summer and winter. In July and August the temperature may reach 100°, while in midwinter it occasionally falls as low as 40° below zero. In the northern part of the state the snowfall is often heavy. The atmosphere is dry, and the climate is generally healthful. The average annual rainfall is 31.02 inches, and through the spring and summer months there is plenty of moisture for growing crops.

MINERAL RESOURCES. The middle and southern parts of the state are underlaid with coal, and the area extends northwesterly to near the central counties, though the mining area is confined to the valley of the Des Moines River. With the exception of Colorado, Iowa produces a larger quantity of bituminous coal than any other state west of the Mississippi River. There are valuable deposits of lead ore in the vicinity of Dubuque, these being extensions of the deposits found on the opposite side of the Mississippi, in Illinois. Clay suitable for brick and tile is very generally distributed over the state and clay suitable for pottery is also abundant. In value the clay products rank next to coal. In Webster County, in the center of the state, there is a large deposit of gypsum, valuable for making stucco (See GYPSUM; PLASTER OF PARIS). Limestone and building stone are also distributed over the state. However, with the exception of the mining of coal and lead ore, the mining industries of the state are comparatively unimportant. There is also material for the manufacture of portland cement, and this will become an important industry.

AGRICULTURE. In 1905, 97.4 per cent of the surface of Iowa was included in farms, and of

this area over 86 per cent was improved. Nearly the entire state is covered with a deep, rich soil, free from stones and easily tilled. There are practically no forest areas, the timber being confined to narrow belts along the streams. These conditions, combined with its thriving population, have made Iowa the leading agricultural state in the Union. Corn is the chief crop, and nearly one-fourth of the tillable area is planted to this cereal each year. The corn area is generally in the southern and southwestern part of the state, and the annual crop is about 300,000,000 bushels, placing Iowa first among the corn-growing states. In the northern part of the state oats, rye and potatoes are more generally grown. Timothy, clover and alfalfa are raised, and large quantities of hay are obtained from native grass. Apples, grapes, cherries and other fruits are produced in large quantities.

The state contains an abundance of grass land for pasturage and the growing of hay. This, with the large crops of corn and other cereals and an abundance of pure water, especially adapts Iowa to stock raising, and this branch of agricultural industry is very important, Iowa being exceeded in its number of cattle only by Texas. Large numbers of draft and driving horses are also raised, as are swine and sheep. Many of the farmers in the corn belt purchase animals from the grazing regions to the west and fatten them through the winter, so that the state exports a very large number of beef cattle. The dairy industry is also important and is of such magnitude as to place Iowa in the front rank as a dairy state. Creameries and cheese factories are numerous, and large quantities of butter and cheese are made in the homes. In 1900 Iowa was exceeded only by New York in the number of milch cows.

MANUFACTURES. The manufacturing industries are limited, because of the great advantages in agriculture. The most important manufactures are those of lumber, flour and grist mill products, farm implements and machinery, pottery, glucose and food products, such as syrup and canned goods. The manufacture of pearl buttons, made from the shell of a freshwater mussel which is found in abundance along the streams, is also an important industry.

TRANSPORTATION AND COMMERCE. The Mississippi affords transportation for the eastern part of the state, and the Missouri is also navigable, but the construction of numerous lines of railway and the obstructions to navigation, such as snags and shallow water, make these

streams of less importance as means of transportation than they formerly were. Trunk lines of railway extend across the state from east to west in the northern, central and southern parts of the state, and these are connected by numerous cross lines. As most of these lines have constructed spurs wherever the traffic would warrant, every county in the state has one or more railway lines passing through it, and nearly every town is within a few miles of a railway station. Thus transportation facilities are adequate and convenient for all industries. The railway mileage exceeds 6500 miles.

The commerce of the state is large; it consists in the export of grains, live stock, meat, butter, poultry products and some manufactures, and the import of manufactured goods and food-stuffs that cannot be profitably produced within the state.

GOVERNMENT. The legislative department consists of a senate, restricted to 50 members elected for four years, and a house of representatives of over 100 members, elected for two years. The senators are divided into two classes, so that the terms of one-half of their number expire every two years. The executive department consists of a governor, a lieutenant governor, a secretary of state, an auditor, a superintendent of public instruction, a railroad commissioner, a clerk of the supreme court, a board of control, an attorney-general and a treasurer, each elected for two years. The judiciary department consists of a supreme court, consisting of six judges, elected for six years; twenty district courts, each district having from two to four judges, elected for the term of four years; lower courts, established by legislature as the case requires. Local government is administered by county officers.

EDUCATION. Iowa maintains an excellent system of public schools, and her percentage of illiteracy is very low, in 1900 being only 2.3. The public school fund is large, and has been obtained almost entirely from the sale of school lands. This is supplemented by state and local taxation. The schools of the state are in charge of the superintendent of public instruction, and the schools of each county are under the supervision of a county superintendent. There is a state board of examiners which issues state licenses to teachers upon examination. Most of the towns and villages maintain high schools, which are affiliated with the state university. The higher educational institutions of the state are the state university at Iowa City, the state normal school at Cedar Falls and the state col-

lege of agricultural and mechanic arts at Ames. These institutions are among the best in the United States. The experiment station is located at the state college. There are a number of other colleges and secondary schools maintained by the various religious denominations. Important among these are the Upper Iowa University at Fayette, Iowa College at Grinnell, Cornell College at Mount Vernon, Iowa Wesleyan University at Mount Pleasant, the Central University of Iowa at Pella, Penn College at Oskaloosa, Norwegian Lutheran College at Decorah, Tabor College at Tabor, Des Moines College and Drake University, both at Des Moines, Simpson College at Indianola and Morningside College at Sioux City.

INSTITUTIONS. There is a soldiers' orphans' home at Davenport and a soldiers' home at Marshalltown. The state maintains a college for the blind at Vinton and an inebriate hospital at Knoxville; also a school for the deaf at Council Bluffs and a home for feeble-minded children at Glenwood. The hospitals for insane are at Mount Pleasant, Independence, Cherokee and Clarinda. The state penitentiaries are at Fort Madison and Anamosa, and there is an industrial school for boys at Eldora and one for girls at Mitchellville.

CITIES. Considering the large population of the state, Iowa is unique in having no large cities. Those of importance are Des Moines, the capital; Dubuque, Davenport, Sioux City, Council Bluffs, Cedar Rapids, Burlington, Waterloo, Fort Dodge, Clinton and Keokuk, each of which is described under its title.

HISTORY. The present territory of Iowa was originally inhabited by indians of the Iowa, Illinois, Sac and Fox tribes. In 1673 Marquette and Joliet entered the territory, but no attempt at permanent settlement was made until 1788, when a French indian, Julien Dubuque, built a fort on the site of the city now bearing his name. This was later abandoned. Meantime, in 1803, the United States gained possession of the territory by the Louisiana Purchase, and thereafter Iowa formed a part, in turn, of the territories of Louisiana, Missouri, Michigan and Wisconsin, until 1838, when it was organized as Iowa Territory. A few years before, settlements had been established at Fort Madison, Dubuque and Iowa City. After considerable agitation the state was admitted to the Union in 1846. Thereafter its growth was rapid until the outbreak of the Civil War. The constitution of the state prohibited slavery, and Iowa was active in the

Union cause. After the close of the war, questions of railway regulation, prohibition and labor legislation occupied the attention of the state, and advanced laws have been passed upon all of these subjects.

Iowa, a tribe of indians, the remnants of which are now living in Kansas and Oklahoma on reservations, but which early in the eighteenth century inhabited Minnesota and that region to the south which is now the state of Iowa.

Iowa, STATE UNIVERSITY OF, a coeducational institution of higher learning, founded at Iowa City in 1855. An act of Congress provided an endowment of two townships of land. The university was reorganized in 1860 and now comprises the college of liberal arts, colleges of law, engineering, medicine, homeopathic medicine, dentistry and pharmacy and the Iowa School of Political and Social Science. The college of liberal arts maintains a summer session for teachers and a summer school for library training. It also maintains a lecture and university extension department. The university now has 17 buildings and an annual income of over \$400,000. Its enrollment is about 2,000, and there are over 165 members in the faculty. The libraries contain about 100,000 volumes. The regular publications include a *Natural History Bulletin*, a *Law Bulletin*, *University Studies in Psychology* and *Studies in Economics, Politics, Languages and History*.

Iowa City, IOWA, the county-seat of Johnson co., 54 mi. w. of Davenport, on the Iowa River and on the Chicago, Rock Island & Pacific railroad. It was the capital of the state until 1854, and the original capitol building and grounds are now used by the state university. Here are also the Iowa City Academy, the state historical society's library, a Carnegie library and Mercy Hospital. Other important structures are the courthouse, the city hall and the opera house. The various manufactures include agricultural implements, flour, meats, woolen goods and jewelry. The place was founded in 1839 and became a city in 1853. Population in 1905, 8497.

Iowa River, a river in Iowa, rising in Hancock County. It flows in a southeasterly direction into the Mississippi. It is 300 miles long and is navigable for a distance of 80 miles from its mouth.

Iowa State College of Agriculture and Mechanic Arts, a coeducational institution, established by an act of legislature in 1858 and located at Ames, Iowa. In 1862, together with

other agricultural colleges, it came into the possession of a tract of land granted by Congress (See AGRICULTURAL COLLEGE). The institution was not formally opened until 1869. It contains departments in agriculture, engineering, veterinary medicine, science and domestic economy. The instruction is of the highest grade, and the state agricultural experiment station is connected with the college. The institution has a farm of nearly 800 acres, upon which the theories are applied in practical agriculture and portions of which are used by the experiment station in working out results. Some of these results have been highly beneficial, not only to the farmers of Iowa but to those of a number of other states bordering on the Mississippi. The number of students is about 2000, and the number on the faculty is over 80. The library contains 14,000 volumes.

Ipecacuanha, *ip'e kak'u an'a*, a medicinal substance of a nauseous odor and a repulsive, bitterish taste. It is the dried root of several kinds of plants growing in South America. The best is the annulated ipecacuanha, which comes from a small, shrubby plant, a native of Brazil, Colombia and other parts of South America. The name of *American Ipecacuanha* is given to euphorbia, which grows in sandy places in North America.



IPECACUANHA

Iphigenia, *if'y je n'ah*, in Greek legend, the daughter of Agamemnon and Clytemnestra. Agamemnon, by killing a hind sacred to Diana, had so enraged that goddess that she detained at Aulis the fleet which was prepared to sail against Troy, and when the oracles were consulted as to means of gaining favor with the goddess, they replied that Agamemnon must sacrifice his daughter. Iphigenia was accordingly sent for on the pretext that she was to be

married to Achilles, but when she arrived at Aulis she was delivered to the priests to be sacrificed. As she was about to be killed, she was caught up by Diana in a cloud and carried to Tauris, while a hart was left in her place. At Tauris she became priestess of Diana, and it was here that her brother Orestes afterward found her.

Ipsambul, *eep sah'm'bool*. See ABU-SIMBEL.

Ipswich, *ips'wich* or *ips'ich*, MASS., a town of Essex co., on the Ipswich River and on the Boston & Maine railroad, 27 mi. n. e. of Boston. Hosiery, isinglass, heels, underwear and soap are manufactured here. The town was settled in 1633 by John Winthrop and was given the name of Agawam, but the name was changed in the following year to Ipswich. It was one of the earliest of the American towns to resist taxation by the British Parliament. Population in 1905, 5205.

Iquique, *e ke'kay*, a city of northern Chile, South America, capital of the Department of Tarapaca, is situated on the Pacific coast, in the vicinity of valuable saltpeter and silver mines. Iquique formerly belonged to Peru, but in 1891 the Chileans stormed and captured it. Population, 25,000.

Iran, *e rahn'*, the name given by the ancient Persians to their native land. It is still used by the modern Persians, though it is also employed in a wider sense to designate the whole of the country from the Indus to the Tigris.

Iranian Languages, a family of languages belonging to the Indo-European stock, closely allied to the Indian group and called by some philologists Persian, from the best-known member of the family. The two oldest known Iranian languages are the Old Persian of the cuneiform inscriptions and the Old Bactrian, or Zend, the latter the language in which the Zend-avesta, or sacred writings of the Parsees, is composed. The Middle Iranian languages are the Pehlevi, and still later the Parsee, which are preserved in the commentaries to the Zend-avesta. The latter approaches closely the modern Persian. The most important of the New Iranian languages is the modern Persian, in which has been produced a rich and celebrated literature.

Iranians, a name derived from Iran, the ancient name of Persia, and applied to Persians, ancient and modern, Bactrians and Kurds. Conquest and the natural intermingling of tribes has made it impossible to define closely the limits of the Iranian stock as it exists to-day.

The ancient Medes and Persians were a highly civilized people, but some of the Iranian hill tribes were never far from savagery. The ancient religion of the Iranians was that of Zoroaster, but in modern times most of them profess Mohammedanism.

Irawadi, *ir a wah'dy*, or **Irrawaddy**, a large river of southeastern Asia, traversing Lower and Upper Burma from north to south, falling into the Indian Ocean (Bay of Bengal) by various mouths, forming a great delta. The chief tributaries are the Khyendwin and the Bhaino, and the Rangoon and the Bassein branch form the east and west boundaries of the delta, a region covered with forests of teak. The river is navigable for 800 miles, though there are some rapids which offer obstruction. Mandalay is situated on the banks of the Irawadi.

Ire'land (in Irish, *Erin*; in Latin, *Hibernia*), popular name, the EMERALD ISLE, the more western and the smaller of the two principal islands of which the United Kingdom is composed. It is separated from Great Britain on the east by the Irish Sea and is surrounded on all other sides by the Atlantic Ocean. Measured diagonally, the greatest length, from Mizen Head in the southwest to Fair Head in the northeast, is 300 miles; and the greatest breadth, from Carnsore Point in the southeast to Benwee Head in the northwest, is 212 miles; the central breadth, between the bays of Dublin and Galway, is 110 miles. The area is 32,531 square miles, a little less than that of Maine. Population, 4,458,775.

SURFACE AND DRAINAGE. The coast, forming a line of nearly 3000 miles, is, in general, bold and rugged and has numerous indentations, some of which run far into the land and form excellent natural harbors. There are a number of islands, chiefly on the west coast, the largest being Achill. The mountains, generally speaking, rise in isolated masses at a short distance from the coast, the interior having the form of a vast plain, in which are extensive tracts of bog. The Macgillicuddy's Reeks, in the southwest, are the highest land, the culminating summit being Carrantual, 3414 feet. The mountains of Wicklow, in the southeast, reach a height of over 3000 feet.

Rivers are not only numerous, but are very equally distributed over the surface. The Shannon, in the west, the largest river of Ireland, if not of the United Kingdom, is navigable to its source in Lough Allen, forming a waterway of 240 miles. The other rivers of most importance are the Bandon, the Lee, the Blackwater, the Suir

and the Barrow, which enter the sea on the south, the last two by the union of their streams forming the broad estuary of Waterford harbor.

CLIMATE. The climate is on the whole more moist, milder and more equable than that of the greater part of Britain. It is highly favorable to vegetation and allows many delicate plants to winter in the open air; some species of plants grow in Ireland but nowhere else in the British isles, as, for instance, the strawberry tree or arbutus, found in the southwest. See GREAT BRITAIN, subhead *Climate*.

MINERAL RESOURCES. In some cases, particularly in the southwest, the coal measures occupy considerable areas, but the quality of the coal is generally very inferior, and it is worked only to a very small extent, the yearly output being only about 100,000 tons. Of other minerals than coal, Ireland yields small quantities of iron ore, lead ore, slate, alum and salt.

FISHERIES. Though not so large as those of Scotland and England, the fisheries of Ireland constitute an industry of considerable importance and give employment to about 28,500 people. The value of the yearly catch is about \$1,000,000. Salmon abound in the streams and coast waters, and herring, cod and pilchard are also taken in large quantities.

AGRICULTURE. As regards agriculture, Ireland has great advantages; for though there is a great extent of moorland, there is also a vast area of arable surface, covered with a deep, rich soil. Notwithstanding, agriculture on the whole is in a backward state, a result largely due to the small farms and to the evils of overcropping. Most of the land is held in large estates and rented on oppressive terms to permanent tenants. However, within the last few years there has been a marked improvement in agricultural conditions. The rearing of live stock and dairy farming are largely carried on. By far the largest grain crop is oats; the chief food crop is potatoes, which are cultivated over an area about one and a half times as large as in Great Britain. Another staple crop, especially in the north, is flax.

MANUFACTURES. The leading manufacture consists in the making of linen goods. This industry has its center in Belfast, which has become famous for its excellent linens. Considerable attention is also given to the manufacture of woolen textiles. Brewing and distilling are also important, as is the embroidering of muslin, which in and about Belfast gives employment to a large number of people.

TRANSPORTATION. Railways connect all of the leading towns. The Shannon is navigable for ocean steamers as far as Limerick, and nearly all streams are navigable in their lower courses for smaller boats. Many of the rivers have been canalized, and all of the principal streams are connected by canals, so that Ireland has an excellent system of inland waterways, which, combined with the railways and good roads, afford ample transportation facilities.

The principal articles of export are grain, live stock, dairy products, fish and manufactured articles, particularly linen, whisky and porter. Most of the trade is with England.

INHABITANTS AND LANGUAGE. The larger part of the inhabitants are descendants of the ancient Celts, who occupied the island at the time of the Roman conquest of Great Britain. The people are known as Irish, and their language is a branch of the Celtic tongue and is used quite generally by the country people; English, however, is the prevailing language in towns, is the official language and is spoken to some extent and quite generally understood by all. The Irish people are noted for their kindness, industry and wit. Thousands of them have emigrated to other countries, particularly to the United States, where they have become naturalized and make good citizens.

GOVERNMENT AND RELIGION. Ireland, by the act of union, became in 1801 an integral part of the United Kingdom. As in England, the chief legal functionaries are a lord chancellor, a lord chief justice and a master of the rolls. For local government the island is divided into four provinces and thirty-two counties. See *GREAT BRITAIN*, subhead *Government Administration in Scotland, Wales and Ireland*.

The Roman Catholic faith is embraced by the larger part of the inhabitants. The Anglican Church and the Presbyterian Church have the next largest followings, while other Protestant denominations are found in the larger cities, though their following is small. All churches are supported by voluntary offerings.

EDUCATION. The principal educational institutions are Dublin University and the three Queen's Colleges of Belfast, Cork and Galway. The Queen's Colleges were formerly connected with an examining and degree-conferring body (Queen's University); but for this a similar body, the Royal University of Ireland, was substituted in 1882, \$100,000 being yearly granted from the surplus funds of the Irish church. The Royal College of Science, established in 1867, supplies

a complete course of instruction in science applicable to the industrial arts. The Catholic University of Ireland, established in 1854, consists of University College, Dublin; Saint Patrick's College, Maynooth, and several other colleges. See *EDUCATION, NATIONAL SYSTEMS OF*, subhead *Great Britain*.

CITIES. The chief cities are Dublin, the capital; Belfast, Cork, Limerick and Queens-town, which is an important seaport. Each of these is described under its title.

HISTORY. Little is known with certainty concerning the earliest history of Ireland. From the native legends we know that the island was for many centuries inhabited by various Celtic tribes; but the authentic record begins with the fourth century A. D., when the Scoti, the strongest tribe, subdued the other tribes inhabiting the island and descended upon Britain, then a Roman province. From Britain they extended their expeditions into Gaul. In these early centuries, Ireland seems to have been divided into numerous provinces, each of which, although it had its own king, was dependent on one monarch, to whom the central province was given. Each clan also had a chief, who was chosen from its most important family. The religion of Ireland in the early centuries of the Christian era was a nature worship, and the priests, or Druids, and poets, or bards, occupied a position almost equaling that of the king in honor. Christianity found its way into Ireland at an early date, and by the middle of the fourth century it had made considerable progress. It is said that more than in any other heathen country, conversion to Christianity in Ireland was bloodlessly effected. By 432 the young British priest, afterward known as Saint Patrick, began his great mission in Ireland. Other missionaries continued the work in the sixth century, and many churches and monasteries were founded. Religion and learning flourished in the monasteries, which soon began to send out zealous missionaries to establish churches in Britain and on the continent.

In the eighth century the Norsemen began to make incursions upon the Irish coast, and by the ninth century they had pushed far into the interior and founded a kingdom. Brian Boroinhe defeated them in 1014 and united the greater part of the island under his rule. After the death of Brian, the island relapsed into its former state of division and anarchy. Henry II of England was authorized by the pope in 1155 to take possession of Ireland on condition of paying an annual tribute, but not until twelve

years later was he able to turn his attention to the island. Dermot MacMurragh, king of Leinster, who had been driven from his kingdom, fled to England and, seeking refuge at the court of Henry II, obtained permission to enlist the services of English subjects for the recovery of his realm. Returning with a force of English, led by Richard Clare, called "Strongbow," Dermot was for a time successful, and regained his seat on the throne. Upon his death Strongbow, who had married Dermot's daughter, came to the throne, and his English subjects were permitted to establish themselves on lands in the eastern part of the island. When Henry II visited Ireland in 1172 he received the homage of the great princes and was recognized as lord of Ireland.

Many Norman barons and their followers now settled in the country, but the English power was far from being established over the whole of it, and the gradual adoption by these new settlers of the customs and languages of the natives decreased British power. By the time of the Wars of the Roses the only part over which England had real authority was a few towns on the coast and a small district about Dublin and Drogheda, known as the Pale. The Irish lived according to their old customs, under their own chiefs, and in manners and mode of life were still totally uncivilized. Under Henry VII a law was enacted making the Irish parliament dependent upon the English king, and the power of the English thus became somewhat stronger.

Soon after Henry VIII had declared himself the head of the Anglican Church, he began his crusade against the Catholics in Ireland. He caused the monasteries to be destroyed and their wealth to be confiscated, and ordered the prosecution of all persons who refused to recognize him as the head of the Church. To offset these attacks on the religion of the Irish, Henry allowed the Irish chiefs a share in the confiscated property of the monasteries and left them under their own laws. In 1541, by an act of the Irish Parliament, Henry was given the title of *King of Ireland*, instead of *Lord*. Edward VI continued the policy of his father of combating the Catholic religion in Ireland, but this change was bitterly opposed, and Mary was able to undo all that had been done by her two predecessors in establishing the Protestant religion.

Elizabeth in her turn imposed Protestant clergy upon the people, and her reign was marked by a series of risings which terminated in the reduction of the whole island. Great stretches

were taken from the Irish chiefs and distributed among English noblemen, who were to settle their new estates with English farmers. The injustice of this system and the fact that Catholics were excluded from all public appointments led in 1641 to another attempt to shake off the English yoke. Great atrocities were committed on both sides. In 1641 Cromwell was appointed lieutenant of the island and energetically but cruelly reduced the country in nine months. James II, himself a Catholic, advanced Catholics in Ireland to important positions, and when, after the revolution which placed William and Mary on the throne, James landed in Ireland and sought Irish aid for his restoration, he was enthusiastically received. In 1690, however, William III landed in the island and in the Battle of the Boyne completely defeated the forces of James. Limerick, the last place which held out for James, capitulated in 1691, and a treaty was concluded by which the Catholics in Ireland were to be allowed the exercise of their religion. This treaty was not well kept by the English. By a decree of Parliament passed a short time later, hundreds of thousands of acres of Irish land were confiscated and divided among Protestants. Cruel penal laws were passed against those who adhered to the Catholic religion; Catholic ecclesiastical dignitaries were banished, and all Catholics were declared incapable of holding public office, acquiring landed property or entering into a marriage with a Protestant.

All of these laws were not always rigorously carried out, yet they excited great bitterness of feeling and led to frequent risings. In 1778 the laws were made much more lenient, the Catholics were given a right to acquire landed property, erect schools and exercise their religion under fewer restrictions. In 1798, while England was engaged in the war with the revolutionists in France, the Irish again revolted, but the rebellion was speedily crushed. The British government now resolved to unite the English and Irish parliaments, and an act providing for the legislative union of the two countries passed the Irish and the British parliaments in 1800.

The Irish patriots bitterly opposed this extinction of the legislative independence of Ireland, and from that day until the present there has been more or less agitation for its repeal and the establishment of the old Irish parliament. In 1841, under Daniel O'Connell, Ireland was brought to the verge of insurrection, but the movement was suppressed (See O'CONNELL,

Ireland

DANIEL). For many years other troubles had racked Ireland, occasioned by the oppressive land laws which had been enacted from time to time. The suffering caused by these laws came to a climax in 1845 and 1846, when a great potato famine occurred. Thousands died of starvation and hundreds of thousands emigrated to America. Subsequently certain reforms in the land laws were carried out, and agricultural and manufacturing interests revived, but the struggle for liberty continued and took form in an agitation for so-called home rule (See **HOME RULE**). In 1886 Gladstone introduced into Parliament a bill for granting separate legislation for Ireland, but this was rejected by Parliament. A permanent act for the repression of crime in Ireland was passed in 1887. In 1898 an important act was passed, establishing Irish county councils, rural district schools and boards of guardians, and encouraged by this the people began to proclaim more boldly their discontent with the existing land laws and their desire for home rule. In 1903 the Land Purchase Bill was passed, providing that tenants or sub-tenants may purchase the land from great landlords and hold it as their own, the land question being thus disposed of. Home Rule is now the only important issue dividing the peoples of England and Ireland, and since, with the disposal of the land question, the principal obstacle in the way of some form of Irish home rule is removed, it is probable that before long that subject will be taken up on its own merits by the political parties of England.

LANGUAGE AND LITERATURE. The Irish language belongs to the Gaelic branch of the Celtic group of languages, and it is closely akin to the Gaelic of Scotland and the Manx, and more remotely allied to the British dialects—Welsh, Cornish and Breton. While there are in Ireland many people who speak the Irish language only, by far the larger part of the inhabitants speak English, also.

Irish literature is rather varied and extensive, including history, legendary and actual, in prose and verse; annals, genealogies and pedigrees, mythological and imaginative tales, lyric poetry, satire, lives of saints and treatises on law, science and grammar. Some of these may be as old as the fifth century of our era. One of the earliest historic pieces is a metrical life of Saint Patrick. The glosses written to Latin works by Irish ecclesiastics, in the monasteries on the Continent, founded during the seventh and eighth centuries, are among the oldest

Ireland

specimens of the language. Many bardic remains belong to the period of the English conquest, but after that date Irish poetry appears to have sunk. Many bards, however, who were still maintained by the native chiefs, helped by their songs to keep up a national feeling hostile to the English domination. The chief interest, in fact, in mediæval Irish literature attaches to the ballad cycles.

Although Irish prose almost ceased to be produced after the seventeenth century, as English became more and more common, the Irish language was much used in poetry until the nineteenth century, when it practically passed out of use for literary purposes. Societies have been formed for the restoration of the language for literary uses.

Ireland, JOHN (1838–), an American Catholic prelate, born in County Kilkenny,



JOHN IRELAND

Ireland. His parents settled in Saint Paul, Minn., and he was educated in France for the priesthood and was ordained in 1861. After his ordination he became prominent as a temperance advocate. He was made coadjutor bishop of Saint Paul in 1875, and on the resignation of Bishop Grace, in 1888, he was made archbishop of Saint Paul. He was also active in establishing the Catholic University in Washington, in colonizing the Northwest and in

many other movements, in all of which his energy, ability, character and personality have won for him great influence.

Irenaeus, *i re ne'us*, SAINT, an early Christian writer of the latter part of the second century, a disciple of Polycarp. He was priest of a church in Lyons and then bishop, a position he filled for twenty-five years. He was active in opposing the Gnostics and in trying to settle the trouble between the Eastern and Western Churches, concerning what day should be observed as Easter. There remains of his work only a Latin version of *Against Heresies*. His day is June 28.

Ire'ton, HENRY (1611-1651), an English general, son-in-law of Cromwell. He joined the Parliamentary army at the outbreak of the war against Charles I, was taken prisoner at the Battle of Naseby, but regained his liberty at the close of the engagement. As a member of the court which tried Charles I, he was an advocate of the death sentence and was one of the signers of the death warrant. Cromwell, when he was recalled from Ireland on the outbreak of insurrection in Scotland, left Ireton to complete the subjugation of Ireland, and this he did with much severity. He died at Limerick and was buried in Westminster Abbey. His body was taken up at the Restoration and burned.

Irid'ium, a metal of a whitish color, discovered in the black scales which remained when native platinum was dissolved in *aqua regia*. Iridium takes its name from the variety of colors it exhibits while dissolving in hydrochloric acid. It is not malleable and is the most infusible of metals. It forms a number of alloys, one of which, *iridosmine*, occurs native. The alloy with gold is malleable and much resembles gold in appearance; that with copper is very hard, pale red in color and ductile. The iridium ores are found on the Pacific coast of the United States, in various districts of the Ural Mountains and in smaller quantities in other parts of the world.

Iris, in Greek mythology, the fleet, golden-winged messenger of the Olympian gods, represented with wings and with a herald's staff in her hand. The rainbow was originally regarded as the path over which she passed to earth, and thus Iris herself came in time to be regarded as the personification of the rainbow.

Iris. See EYE.

Iris, a genus of plants belonging to a family which is related to the lilies. One species,

known as the *flower-de-luce*, or *fleur-de-lis*, became the national flower of France in the thirteenth

century and later was used as the national emblem. It is also the emblem of the city of Florence.

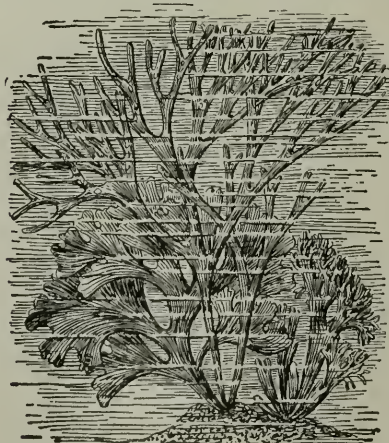
The common blue flag, which grows wild in the United States in swamps and other moist places, is another species of the iris. Orris root comes from a European species.

Many beautiful species are grown in gardens, and many varieties are produced by cultivation.

Irish Moss, a seaweed very common on rocks and stones on the coast of England and



BLUE FLAG



IRISH MOSS

Three different forms of growth.

Ireland. It is a variable weed with a flat, branching frond, usually of a deep purple-brown color. When dried it becomes whitish, and in this condition it is known as Irish moss.

Irish Sea

Nutritious soups and jellies are made from it. Carrageen is one of its local names.

Irish Sea, the part of the Atlantic Ocean between Great Britain and Ireland, n. of Saint George's Channel and s. of the North Channel. It is 130 miles long and about 60 miles wide. It contains the islands of Anglesey and Man.

Iritis, an inflammation of the iris of the eye. It is accompanied by a remarkable change in the color of the iris and causes great pain in the eye, forehead and side of the head, a pain which frequently grows more severe at night. Iritis may be caused by wounds in the iris, from too prolonged use of the eye or from constitutional diseases, such as rheumatism or tuberculosis.

Irkutsk, *eer kootsk'*, a city in southern Siberia, capital of a government of same name, situated on the Angara, 30 mi. from the north-west shore of Lake Baikal. It manufactures woollens, linens and leather and carries on a good trade in tea and other articles imported from China. Population, 51,434.

Iron, *ir'urn*, a hard, silver-gray metal, with a soft but brilliant luster. It is about seven and three-fourths times as heavy as water; has a fibrous or crystalline structure, according to the process of manufacture; softens before fusing; is highly ductile and malleable (See DUCTILITY; MALLEABILITY), and can be tempered to various degrees of hardness (See TEMPERING). Iron has a strong tendency to unite with oxygen, forming a number of oxides, some of which constitute its most valuable ores. It also unites with sulphur, chlorine and carbon dioxide. The compounds with chlorine are useful in medicine, and one of the compounds of sulphur, commonly known as pyrite, is of value in the manufacture of iron sulphate, or copperas.

Pure iron is seldom seen and is useful only in laboratories for experimental purposes. The iron of commerce contains varying proportions of carbon, silicon, sulphur, phosphorus and other impurities. Of these carbon exists in the most varying proportions and produces the greatest effect upon the quality of the metal. Sulphur and phosphorus are highly injurious. Sulphur, even in very small quantities, makes steel brittle when heated, or *red short*, and phosphorus makes it brittle when cold, or *cold short*. Iron unites with nickel, aluminum, manganese and one or two other metals to form valuable ores.

ORES. *Kinds.* The most common ores of iron are red hematite, or specular iron, brown

Iron

hematite, or limonite, magnetic iron, or magnetite, and carbonate of iron, or spathic iron. Each of these is described under its proper title. The red hematite is found in by far the largest quantities, and it is from this ore that most of the iron of commerce is obtained.

Distribution. Iron ore is very liberally distributed over the earth, and with the exception of Australia every continent has a good supply. In Europe the most valuable deposits are found in the Ural and Caucasus Mountains in Russia; in the Scandinavian peninsula; in Lorraine and Luxemburg, Germany; in Spain and the island of Elba; in Styria, Austria, and in England in North Yorkshire, Cumberland, Lancashire, Leicestershire and Northampton. The ore obtained from the Russian and Scandinavian mines is magnetite and hematite of a high grade, while that obtained from the other mines is low grade hematite or limonite. Extensive deposits of ore are also found in China and India and smaller quantities in Japan, while Africa contains very large deposits, though none of them have been worked except as a few of the native tribes in the equatorial regions by rude methods fashion the metal into weapons and edged tools. Canada has extensive mines in Newfoundland, Quebec, Ontario and British Columbia. There are also large deposits of iron in the various mountainous countries of South America.

The United States is the largest producer of iron ore. The districts from which this is obtained are around Lake Superior, in the Adirondack Mountains, in Western Pennsylvania and Virginia and in Alabama and Georgia. By far the largest quantity of iron comes from the red hematite, as shown from the following table:

Red hematite.....	78.58 per cent.
Brown hematite	13.28 per cent.
Magnetite	7.57 per cent.
Carbonate57 per cent.

The different areas from which iron ore are obtained are comparatively small. The Lake Superior region lies within half of a circle having a radius of 135 miles, and most of the mines are near the circumference of this circle. A circle 100 miles in diameter would include the ore regions of Alabama and Georgia. A parallelogram 60 miles long and 20 miles wide would embrace all the valuable mines of the Lake Champlain district in northern New York, and Lebanon County would include the valuable mines of Pennsylvania. The Lake Superior

region is by far the most productive and yields nearly three-quarters of the ore produced in the country. The principal states, in the order of their production, are Minnesota, Michigan, Alabama, Pennsylvania and New York. The following states produce considerable ore: Virginia, Wisconsin, Tennessee, New Jersey, Georgia, Colorado, Missouri and Ohio.

Mining and Shipping Ore. The methods of mining depend upon the character of the ore. If it is in the form of a ledge, the rock must be blasted; but if the rock is disintegrated, this process is not necessary. The most interesting method is that employed in the Lake Superior region. Here the ore is in the form of rotten stone, which is so soft that it can be scooped up with steam shovels and loaded directly upon the cars. The only preparation necessary to obtaining the ore is the removal of the surface soil, or *stripping*. The shovels are of large size, and under favorable conditions a single shovel will handle 6500 tons of ore in a day, at an average cost of sixteen cents a ton (See STEAM SHOVEL). The ore cars are so constructed that they can be emptied by dumping or by opening slides in the bottom. When they reach the ore docks, the cars are run on to an elevated platform, beneath which are numerous bins or pockets, each having a slanting floor leading to a chute. The ore is dumped from the cars into these pockets, and the chutes are connected with the hold of a vessel; and when the valve is opened at the entrance of the chute the ore runs into the hold. A large vessel connects with several chutes and requires but a few hours for loading. Ore vessels are constructed especially for this sort of traffic and transport ore from Duluth or adjoining ports to Cleveland and Erie at an expense of less than two dollars per ton.

Devices for unloading the vessels are even more ingenious than those for loading. Steel bridges mounted upon elevated tracks and operated by electric motors are so arranged that they can be brought opposite an opening in the ship's hold. At the end of the bridge next to the vessel is a hinged arm that lowers into the hold. This arm and the bridge carry a trolley containing *grabs*, which resemble in shape and construction a double scoop. When the grabs descend to the ore, they fill and close automatically. Each holds about five tons, and they move over the arm at the rate of 100 feet per minute and over the bridge at the rate of 1000 feet per minute, unloading the ore directly on to

cars or the dock, as desired. By these devices a large vessel can be unloaded in from six to eight hours.

Smelting. The ore contains numerous impurities, and in the process of extracting the iron these must be removed. Most of this work is done in the process of smelting. The ore is crushed so that it is as fine as fine gravel. It is then mixed with the necessary proportions of limestone (See FLUX) and coke, and is next taken to the furnace (See BLAST FURNACE). As the iron melts, it runs down to the hearth of the furnace and is drawn off, being cast into rough bars known as *pig iron*. In small furnaces two casts are made every twenty-four hours, but with large furnaces the iron is drawn more frequently.

The former method of making pig iron, and one still used in some furnaces, was to have the floor of the foundry covered with molders' sand to a depth of six or eight inches. In this sand long square channels are made leading from the furnace to various parts of the room, and from each of these, short channels are excavated at right angles. The iron is tapped from the furnace into the long channels, which conduct it to the short ones, and in this manner the entire floor of the foundry becomes covered with molten iron, which, when cool, forms bars. The long channels are called *sows*, and the short ones, *pigs*; hence the name *pig iron*. The method now more generally used in connection with large furnaces employs casting machines, instead of the sand floor. The casting machine consists of two endless chains carrying steel molds of the size and shape of a bar of pig iron. The molten iron is drawn from the furnace into a ladle, and from this it is poured into the molds as they pass along. When filled, the molds pass through a tank of water, to be cooled, and then they move on to the tail sheaves, where the pigs are unloaded on the cars. One of these machines can cast twenty pigs of 120 pounds in a minute.

VARIETIES OF IRON. The varieties of iron in general use are pig iron, wrought iron and steel.

Pig Iron. The process of manufacturing pig iron is described above. Pig iron has a crystalline structure, contains more or less impurities and is usually coarse and brittle. Before it can be used for purposes where great strength is required, it needs to be remelted and refined. It is, however, usable for making ordinary iron castings, such as the parts of stoves and brackets for holding shafting, but

most of it is manufactured into steel or wrought iron.

Wrought Iron. This is the oldest form of iron known and was manufactured directly from the ore by primitive methods long before the process of casting iron had been discovered. It is now usually made by remelting and purifying cast iron. The operation is carried on in a reverberatory furnace and is known as *puddling*. The furnace has an arched top and flat floor, or hearth, which is so placed in relation to the roof that the flame is bent down upon the hearth and softens the iron. In preparing the furnace for charging, the bottom and sides are covered with several inches of some oxidizing material, which is heated until it fuses. Slag is then spread over the bottom of the furnace, and the pig iron is broken into small pieces and laid upon it. Coal, coke or gas can be used for fuel, but gas is preferred. As the iron melts, workmen begin to stir it with a tool called the *rabble*, which is inserted through a small door. The stirring is continued until the color of the molten iron shows the workmen that the impurities have been expelled. The temperature is then gradually lowered, and the iron is gathered into balls. These are taken from the furnace and pressed between rollers to expel the slag. This leaves an irregular rough bar of iron, known as the *muck bar*. Several muck bars are then bundled together and heated to a welding temperature and rolled into blooms, which have the general form of wrought iron as it is placed upon the market (See ROLLING MILL).

Wrought iron is soft, flexible, ductile and malleable. It can be welded and also worked into any desired form. It has a fibrous texture, possesses great tensile strength and can be annealed to various degrees of hardness. These properties adapt it to a much wider range of uses than cast iron, but it has now been almost wholly displaced by steel (See STEEL).

HISTORY. Iron is the most useful of all metals and has been known from the remotest time, though it did not come into general use until much later than gold, silver and copper, probably because of the difficulty in obtaining it from its ores. The first reference to iron in the Bible is found in *Genesis* iv, 22, which refers to Tubal Cain as a worker or artificer in brass and iron. Iron is also referred to in the book of *Job*, which by some writers is considered to have been written before *Genesis*. The ancient Egyptians were familiar with the process of

working iron and undoubtedly knew how to make steel, since some of the tools used by them in building the pyramids and their great temples at Thebes and Memphis were of this metal. The Assyrians and Babylonians were also skilful workers in iron, and it is probable that the Greeks obtained their knowledge of iron-working from these older nations. The Romans obtained their knowledge from the Greeks and made considerable progress in improving the processes of manufacture. When these people invaded Britain they found the natives working iron in rude forges. Other nations of northern and central Europe were also workers of iron at an early date. But it was several centuries before the manufacture in England assumed sufficient importance to warrant its being considered as an industry.

Iron was discovered in the United States in 1585 by the expedition sent out by Sir Walter Raleigh. In 1608 a cargo of ore was shipped from Virginia to England and successfully smelted. The first ironworks in the United States were built in the Province of Massachusetts Bay not far from the present city of Lynn, between 1643 and 1645. The ore used was bog ore, which is still found in the vicinity. Other furnaces were erected, but previous to the Revolutionary War little was done in the smelting of iron in the colonies, chiefly because the industry was opposed by the home government. When the war broke out, the Americans, being deprived of opportunity for importing iron from Europe, were obliged to manufacture many articles for themselves, and this gave some impetus to the industry. Still, after the war it was several years before the manufacture of iron and steel assumed any considerable proportions. One of the most important steps leading to the present magnitude of the iron industry in the country was the use of anthracite coal for smelting. This practice was introduced by David Thomas, at Catasauqua, Pa., in 1840, and his furnace continued in use for twenty-eight years. The construction of railroads led to the use of coke as a fuel, and this still further extended the industry.

The invention of the Bessemer process for making steel greatly increased the demands for iron, and the progress of the industry in the United States has kept pace with these demands. This country now is the largest producer of iron and steel in the world, being followed in order by Great Britain and Germany, but the annual output of the United States now exceeds that of

both these countries. The leading manufacturing cities are not necessarily in the leading centers for the production of iron ore. It requires two tons of fuel to smelt a ton of iron, and it is cheaper to transport the ore than the fuel; consequently the great iron works of the country are in or near the coal regions. The leading states in the manufacture of iron in the order of their importance are Pennsylvania, Ohio, Illinois, Indiana and Alabama.

IRON IN MEDICINE. Iron is an important ingredient of the blood and some of the tissues, and when the system is deficient in iron, weakness and general debility follow. Usually, a preparation of iron will restore one in this condition to his normal health. Iron is also used as an astringent, and in some cases to stimulate digestion. The oxides and several salts are used in medical preparations, the most common being a tincture of the chlorate of iron.

For the manufacture of steel, see **STEEL**.

Iron Age, a term indicating the period or stage in civilization and culture when people used iron as the material for their tools and weapons. It is the last of the three prehistoric ages of progress. In Europe the knowledge of iron began at the south and extended northward. Greece, as represented in the poems of Homer, was then changing from the use of bronze to that of iron, while Scandinavia did not enter her Iron Age until about the beginning of the Christian era. The implements and weapons of the Iron Age are not cast, but are hammered into shape, and accordingly they take a greater variety of forms and are much more beautiful than those of the earlier ages. During the age of iron, written characters were introduced and the foundation of historic records was laid. See **STONE AGE**; **BRONZE AGE**.

Iron Chancellor, *chan'sel lor*, the popular name for Bismarck.

Ironclads, *i'urn kladz*. See **WAR SHIP**.

Iron Crown, a golden crown set with precious stones, used at the coronation of the Lombard kings and afterward at the coronation of the German emperors, when the latter assumed the character of kings of Lombardy. It received the above name from an iron circle in it, forged, according to tradition, from a nail of the cross of Christ. It was worn by Charlemagne, by Charles V and by Napoleon I.

Iron Duke, the popular name for the duke of Wellington.

Iron Gate, a narrow place in the course of the Danube below the point where it leaves

Austrian territory and becomes the boundary between Servia and Rumania.

Iron Mask, **THE MAN WITH THE**, an unknown personage, kept in various French prisons, who for a long time excited much curiosity. All that is known of him is that he was above middle height, of a fine and noble figure and delicate brownish skin; that he had a pleasant voice, was well educated and fond of reading and guitar playing, and that he died in the Bastille in 1703. The mask he wore seems to have been of black velvet, not iron. Conjecture has given him many names, but no assertion ever made regarding him has been able to stand the test of thorough investigation.

Iron Mountain, a hill in Saint François co., Missouri, 81 mi. s. of Saint Louis. It is 1097 feet above the sea. This mountain consists mainly of porphyry, traversed by an iron ore which is one of the purest and richest ores in the United States.

Iron Mountain, **MICH.**, the county-seat of Dickinson co., 47 mi. s. w. of Marquette, on the Menominee River and on the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. The city is in the vicinity of large iron mines and also has manufactures of mining and agricultural implements. The place was settled in 1879. Population in 1904, 8585.

Ironsides. See **CROMWELL**, **OLIVER**.

Ironsides, **OLD**. See **CONSTITUTION**, **THE**.

Ironton, *i'urn ton*, **OHIO**, the county-seat of Lawrence co., 140 mi. s. e. of Cincinnati, on the Ohio River and on the Cincinnati, Hamilton & Dayton, the Norfolk & Western and several other railroads. The Chesapeake & Ohio also makes connection from the other side of the river. The city is in a region rich in iron ore, coal and pottery clay, and it has extensive manufactures of iron, cement, lumber, machinery, furniture and other articles. The important buildings are Memorial Hall, Masonic Temple, Odd Fellows' Hall, Briggs Public Library and Kingsbury School. The place was settled in 1832 and was incorporated in 1849. Population in 1900, 11,868.

Ironwood, *i'urn wood*, a name given to various trees, from the quality of their timber. The ironwood, or hop hornbeam, of America, is a tree with a trunk not exceeding six inches in diameter, with very hard wood, so heavy that it sinks in water, and with foliage resembling that of birch. Other trees known as ironwood are natives of various parts of the world. Ebony is also called ironwood.



A DESERT PLAIN UNDER IRRIGATION

Ironwood

Ironwood, MICH., a city in Gogebic co., 150 mi. w. of Marquette, on the Montreal River and on the Chicago & Northwestern and the Wisconsin Central railroads. It is in the Gogebic iron region, and mining and lumbering are the principal industries. Ironwood has a fine city hall, a high school and a Carnegie library. Population in 1904, 10,019.

Iroquoian, *ir'o kwoi'an*, **Indians**. The tribes belonging to this group held the land lying along the Saint Lawrence River from the coast to Lake Huron and south through the greater portion of New York and Pennsylvania. They tilled the soil, raising many vegetables, much tobacco and maize. Their houses were substantially built of split timber, and their respect for law and family ties gave them a strong organization. The name Iroquoian was originally applied by Champlain to the five tribes which had formed a league for mutual protection (See FIVE NATIONS, THE). The Huron had originally belonged to this league, but early in the seventeenth century they were expelled, and from that time on all the Iroquoian tribes were engaged in war. Champlain took the part of the Huron, and in doing so he aroused the enmity of the Five Nations against the French—an enmity which was largely responsible for driving the French from their northern possessions. During the American Revolution the Iroquois sided with the English until they were thoroughly defeated by General Sullivan. There are now in the United States and Canada about 40,000 Iroquoian indians, of whom the Cherokee is the largest tribe. See CHEROKEE; HURON; MOHAWK; FIVE NATIONS.

Irrawaddy, *ir'a wah'dy*. See IRAWADI.

Ir'riga'tion, the process of supplying agricultural lands with water by artificial means. Irrigation is one of the oldest of the agricultural arts. It was by this means that the Egyptians obtained the water for their crops in the valley of the Nile, and that method has been continued in Egypt from the remotest time to the present. The Chinese, Hindus and other peoples of the East have also practiced irrigation since long before the dawn of the Christian era. In Egypt recent irrigation works have been constructed which are among the greatest of modern engineering feats. These are the dams across the Nile at Assuan and Assuit. The dam at Assuan is about a mile and a quarter long, 120 feet high and contains 180 sluices. The reservoir formed has a depth of about 66 feet and is large enough to store all the flood water of the Nile from

Irrigation

December till the following period of high water. The second dam is somewhat smaller than the first. The construction of these dams has increased the irrigable area of Egypt over 5,000,000 acres.

UNITED STATES. Irrigation in America was first practiced by the indians who inhabited the arid regions of the United States and Mexico. When discovered by the Spaniards, these people, by their rude methods of irrigation, were supplying small patches of land with sufficient water to enable them to raise enough maize and vegetables for their subsistence. The early Spanish missionaries in Southern California and New Mexico adopted the indian's idea for supplying moisture to the soil and improved upon his methods. The missionary was followed by the miner, who, when he failed in the search for gold, turned his attention to agriculture and soon discovered the unusual fertility of the soil and the adaptability of the climate to a great variety of products. The Mormons, compelled by the force of circumstances, first demonstrated the practical utility of irrigation on an extended scale in Utah. Their plan was a little later adopted in developing the Greeley Colony in Colorado and has since in modified forms been extended to numerous other localities.

Irrigation, thus early employed in the arid regions of the southwest, has grown in favor and extent with the development of the country and has contributed in no small degree to the agricultural prosperity of the sections where it is practiced. It is now extensively used in all of the states whose annual rainfall is insufficient for the successful growing of crops.

Irrigation is necessary under the following conditions:

1. When the annual rainfall is less than 20 inches.
2. When the annual rainfall, though sufficient for agricultural purposes, is unevenly distributed through the year, the greater portion occurring in months when crops cannot be grown.
3. In the growing of such crops as rice, which require the land to be flooded.

These conditions often render irrigation necessary in regions generally known as humid, and they account for the irrigated districts in Texas, Louisiana and other southern states where rice is grown.

Irrigation requires three lines of work:

1. Conserving the amount of rainfall around the sources of rivers which are used to water the arid regions. This is the work of the state and

national governments and is one of the principal reasons for creating forest reserves. See FORESTRY.

2. The saving of water from melting snow and that which causes the overflow of streams during the rainy season. This requires the construction of numerous reservoirs and often involves expense too great for profitable investment of private capital.

3. Distribution of water to the irrigated districts. This is accomplished through systems of canals. One main channel conducts the water through the irrigated district, and from this small canals branch off at frequent intervals. From these, small canals, ditches and small channels distribute the water to all parts of the field. The plan for obtaining the water from its source depends upon the source of supply and the topography of the country. Whenever possible, streams are tapped by the canals, as this is the least expensive method. In many localities dams are constructed for the purpose of making reservoirs in which to store the surplus water for use during the dry season, or to divert the water of a stream from its original channel into the canals. In other localities the water has to be pumped to the height of several thousand feet in order to reach the irrigated surface. In some sections of Arizona and other localities, the water is obtained from artesian wells. When possible, the wells are so located as to do away with the necessity of canals and large ditches.

Irrigation is available for small farms only and is suited to intensive farming, such as fruit growing. In some instances cereals can be raised with profit by irrigation, and in some localities it is resorted to for the purpose of growing forage plants. The average size of the irrigated farm in the United States is 68 acres. In Utah it is 27 acres, and in the fruit-growing regions of California many of the farms are from 10 to 20 acres each. The income from irrigated lands ranges from \$10 to \$20 an acre, being \$15 for the irrigated district as a whole. The value of irrigated land ranges from \$50 to \$1000 per acre, according to location and products. Only from one-fifth to one-third of the land upon which irrigation is practiced is actually watered, there being an insufficient supply of water for the remainder.

GOVERNMENT AID. Since 1894 most irrigation projects have been carried on under one of two laws, the Carey Act, passed in 1894, and the Reclamation Law of 1902.

The Carey Act. This act grants to each of

the states in the arid region, 1,000,000 acres of desert land, on condition of its reclamation. The national government has no further control over this land after it is granted to the State. Most of the projects undertaken upon the lands thus appropriated have been under private enterprise, the parties entering into contract with the state to reclaim a certain area. Under this law nearly 1,900,000 acres have been reclaimed.

The Reclamation Act. This act was passed by Congress in 1902. It contains the following important provisions:

1. The creation of a reclamation fund which shall consist of the proceeds of the sales of public lands in the sixteen arid or semi-arid states and territories, this fund to be held in the treasury of the United States.

2. The establishment of a reclamation service in the United States Geological Survey, to investigate and report on the irrigation projects for the approval of the secretary of the interior, under whose authority construction may be authorized and contracts let.

3. The return to the fund of the actual cost of each project by the sale of water rights, the payments to be made in installments running over a period of ten years.

4. The holding of public lands for actual settlers, under the Homestead Act, in small units sufficient to support a family.

5. The sale of water rights to private land-owners, restricting this to not more than 160 acres to each owner, thus making land monopoly impossible.

6. The final turning over to the people of the irrigation works, except the reservoirs, to be operated and managed by them under a system of home rule. By this provision the users of the water within ten years of the completion of the works will have repaid to the government the amount such works cost, without interest, and the money so returned can be used again and again in the construction of other works.

Since this law became effective twenty-eight projects have been undertaken by the government, and are now wholly or partially completed. The distribution of the reclaimed areas is as follows: Arizona, California, Kansas, Nevada, North Dakota, Oregon, South Dakota and Utah contain one each; Colorado and Idaho have two each; Montana and New Mexico, three; Washington four, and five areas are divided by state boundaries. The total area reclaimed is about 2,000,000 acres.

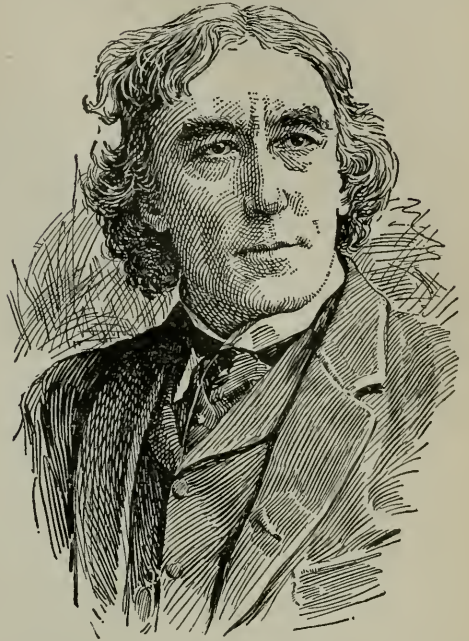


WASHINGTON IRVING

A faint idea of the magnitude of these works can be obtained from a very brief description of a few of the most important ones. One of the largest of these is the dam across the Salt River in Arizona. This dam when completed will be 235 feet long at the bottom and 1,080 feet on top. It will rise 280 feet above the lowest foundations, and the height of the water against the wall will be 230 feet. The reservoir formed by this dam will contain sufficient water to cover 1,000,000 acres of land to the depth of one foot. On the ground to be covered by the water is a city of nearly 2,000 people, but when the dam is completed and the reservoir filled this city will be submerged more than 200 feet. In another project in Colorado the construction of a tunnel six miles long under a mountain more than 2000 feet high is necessary, while another in northern Wyoming requires the construction of a dam 310 feet high. This is across a narrow canyon. The dam is only 85 feet long at the bottom and 200 feet at the top, but such is the shape and extent of the river channel that when completed the dam will form a reservoir capable of irrigating more than 100,000 acres of land. The entire expense of the projects undertaken is estimated at seven times the cost of the Panama Canal, but the reclamation of these lands will add over \$2,350,000,000 to the taxable property of the United States.

Irving, *ur'ving*, HENRY, Sir (1833-1905), an English actor, born in Somersetshire. His name was originally John Henry Brodribb, but the name Irving, which he assumed as a stage name, was legalized by royal license. For a time Irving was a clerk in London, but in 1856 he adopted the theatrical profession. For some years he met with no success, but at length in various light comedy parts he attracted some attention, and in 1870 he gained a real triumph in *The Two Roses*. With his presentation of Matthias in *The Bells* and the title rôles of *Eugene Aram*, *Hamlet*, *Macbeth*, *Richelieu* and *Othello* his fame steadily rose. In 1878 he leased the Lyceum Theater for himself, and with Ellen Terry as his leading actress he soon won recognition as the greatest of living English actors. In his repeated visits to the United States, both alone and with Miss Terry, he met with the most enthusiastic receptions. Besides the characters named, Irving appeared as Shylock, Mephistopheles, Robespierre, Benedick in *Much Ado About Nothing*, and in the title rôle of Tennyson's *Becket*. It was but a few hours after a presentation of this last play that Irving died. As

an actor of great intellectual power, Irving ranks with the foremost of all English actors.



HENRY IRVING

In emotional strength and fire he was somewhat deficient, and this prevented his attaining a place among the greatest actors of all time.

Irving, WASHINGTON (1783-1859), a famous American author, born in New York City. He was educated for the legal profession, but his tastes were in the direction of literature, and as early as 1802 his *Letters of Jonathan Oldstyle* appeared in the *New York Morning Chronicle*. Shortly afterward, being threatened with lung trouble, he sailed for Europe, visited most Continental countries and did not return to America until March, 1806. In the same year he was called to the New York bar. His pen was now very busy, and his sketches of Dutch character, in his *Knickerbocker's History of New York*, which made its appearance in December, 1809, proved him possessed of quaint and genial humor to a high degree. About this time he joined his two brothers in a mercantile venture, and the failure of this business, while he was in London in 1818, threw upon him the burden of his own support and the support of his brothers, as well. He settled in London, where his previous literary work secured his warm reception, and devoted himself entirely to literature, which up to this time he had scarcely regarded as a means of live-

lihood. His first publication, *Geoffrey Crayon's Sketch Book*, which contained the now classic *Rip Van Winkle* and *Legend of Sleepy Hollow*, became immediately popular. For seventeen years, until 1832, Irving resided in Europe, principally in England, France and Spain. This was a period of great literary activity and brought forth some of his most famous works, such as *Bracebridge Hall*, the *Tales of a Traveler*, the *Life of Columbus* and *The Alhambra*. He also acted for a time as secretary to the American embassy in London.

In 1832 Irving returned to the United States and was proudly welcomed as the first man who had secured recognition in Europe for American literature. He bought a country-seat on the Hudson, near the Sleepy Hollow which he had made famous, and here, at "Sunnyside," as he named it, he spent the remainder of his life, except the four years when he served as ambassador to Spain. The chief works of the period before his departure for Spain are *A Tour of the Prairies* and *Captain Bonneville*. He had planned a history of Mexico; had collected much material and had written one chapter; but he learned that Prescott was planning the same work and he magnanimously abandoned his intentions. After his return to "Sunnyside," Irving produced his *Life of Goldsmith*, a sympathetic biography which he was peculiarly fitted to write, by reason of the resemblance of his kindly genius to Goldsmith's own; and he also wrote the affectionate and impartial *Life of Washington*. This is the last work which he finished.

Irving's last years at his beloved "Sunnyside" were serene and happy years. He took no part in public life, but his character won him a place in the affections of the whole nation. His generous nature, his optimism, his loyalty to truth and right are evident in his works and make it easy for us to understand the esteem in which he was held by his contemporaries.

Irvington, N. J., a town in Essex co., adjoining Newark on the southwest. It is a pleasant residence suburb and also contains smelting works, wall paper mills and tool, brush and other factories. The place was settled about 1660, but was not incorporated as a town until 1898. Population in 1905, 7180.

Isaac, *i'zak*, (he will laugh), so called to denote the laughter and gladness occasioned by his birth. Isaac was one of the Hebrew patriarchs, the son of Abraham, by Sarah. He

is remarkable as the offspring of very old age, Sarah being ninety and Abraham a hundred years old at the time of his birth; for his miraculous escape from death as a burnt offering, and for the fraud perpetrated upon him, at his wife Rebecca's instigation, by his son Jacob. He died at Hebron when 180 years old and was buried in the cave of Machpelah, the resting place of Sarah, Abraham and Rebecca.

Isabella II, *iz a bel'la*, (1830-1904), queen of Spain, daughter of Ferdinand VII, was made queen on the death of her father in 1833, with her mother as regent. The early years of her reign were disturbed by a rising in favor of her uncle, Don Carlos, who, if the Salic law had not been set aside, would have ascended the throne instead of her; but this was finally quelled in 1840. She was declared of age in 1843, and her rule was at the outset very popular. Soon, however, she became so despotic that various risings took place, and in 1868 she was driven from the country. She resigned her claims to the crown in favor of her son Alfonso, who ascended the throne in 1875. She lived sometimes in Spain, sometimes in Paris, where she died.

Isabella of Castile (1451-1504), queen of Castile, daughter of John II of Castile and Leon, and wife of Ferdinand of Aragon. She was a woman of great courage and sagacity and contributed no small share to the many remarkable events of the reign of Ferdinand V, including the introduction of the Inquisition, the discovery of America by Columbus and the final expulsion of the Moors after the conquest of Granada. See FERDINAND V.

Isaiah, *i za'ya*, (salvation of Jehovah), the first of the great Hebrew prophets. He began his predictions in the last year of Uzziah's reign. Of his father, Amoz, we know nothing, and of the circumstances of his own life, but little. He had great influence over the kings and people of Judah, and he is supposed to have died at a good old age in Jerusalem, at the beginning of Manasseh's reign. The first portion of the writings that pass under his name consists chiefly of declarations of sins and threatenings of judgments, while the last twenty-seven chapters, together with some previous ones, hold out promises of a glorious future for Israel.

Ischia, *ees'ke ah*, an island in the Mediterranean Sea, belonging to Italy, in the Gulf of Naples, 16 mi. s. w. of Naples. It has beautiful scenery and a fertile soil, producing excellent wine and fruits. It is entirely volcanic in char-

acter and is noted for its warm mineral springs and volcanic convulsions. The capital, Ischia, with about 7000 inhabitants, is a favorite resort of tourists in Italy. Other towns are Casamicciola and Forio, both of which suffered severely from an earthquake in 1883. Population, 26,891.

Isfahan, *is ja hahn'*. See ISPAHAN.

Ishmael, *ish'ma el*, (whom God hears), the son of Abraham, by Hagar (*Gen.* xxi, 8-21). He married an Egyptian wife and had twelve sons and one daughter, who became the wife of Esau. His descendants are Ishmaelites.

Ish'peming, *MICH.*, a city in Marquette co., 15 mi. w. of Marquette, on the Chicago & Northwestern, the Duluth, South Shore & Atlantic and other railroads. It is in the great Lake Superior iron region and has important smelting works, foundries and machine shops. Marble is also found in the vicinity. The place was settled about 1857 and was chartered as a city in 1873. Population in 1904, 11,623.

Isinglass, *i'zin glas*, a gelatinous substance, of which the best kind is prepared from the air bladder of the sturgeon, dried and cut into fine shreds. The American article is obtained from the same organ in the cod, hake and other fish. Isinglass is the basis of the Russian glue, which is preferred to all other kinds for strength. Boiled in milk isinglass makes a nutritious jelly; mixed with other substances and spread on silk it forms courtplaster; with brandy it makes a cement for porcelain and glass.

Isis, the principal goddess of the Egyptians, the sister and wife of Osiris. Isis represented the moon, as Osiris did the sun. The Egyptians believed that Isis first taught them agriculture, and as the Greeks offered the first ears gathered to Ceres, so the Egyptians offered the first to Isis. She is represented under various forms: a woman, with the horns of a cow, as the cow was sacred to her; as crowned with a sun's disk; as bearing upon her head her emblem, the throne. She is also known by the attributes of the lotus on her head and the sistrum, a musical instrument, in her hand. She is often accompanied by her infant son Horus. In one celebrated Egyptian statue she was shown with her face veiled. She was particularly worshiped in Memphis, but at a later period throughout all Egypt. From Egypt her worship passed over to Greece and Rome, and the abuses which it occasioned at Rome caused its frequent prohibition there, but it was repeatedly revived. The Romans never considered the worship,

which was introduced among them by Sulla, 86 B. C., altogether reputable, and its attendant immorality was vigorously lashed in the satire of Juvenal.

Islam, *iz'lam*, that is, complete resignation and submission to the will of God, is the name given in Arabic to the religion originated by Mohammed. The fundamental doctrine of Islamism, the only one it is necessary to profess to be a Moslem, is expressed in the common formula of faith: "There is no God but Allah, and Mohammed is his prophet," to which the Shiah or Shiites, the majority of Persian and Indian Moslems, add "and Ali is the vicar of God."

Island, *i'land*, a portion of land entirely surrounded by water, smaller in size than the great masses of land known as continents. Islands are of all sizes, from mere dots of land or rock in the sea to great masses like Borneo and Cuba. Islands are divided into two distinct classes: *continental* islands, lying in proximity to continents, and *pelagic*, or *oceanic*, islands, from their position in the oceans. Continental islands occur along the margins of the continents and are generally of the same geological structure. Oceanic islands are mostly of volcanic or coral formation. A cluster of islands, such as the West Indies, the Canaries or the Hebrides, is called an *archipelago*.

Island Number 10, an island which, until about 1866, existed in the Mississippi River at about the boundary line between Kentucky and Tennessee. It was an important Confederate post after the fall of Forts Henry and Donelson and was commanded by General McKall. In March, 1862, the Federals under Pope, assisted by a fleet under Commodore Foote, proceeded against the position, captured New Madrid and bombarded the fort on Island Number 10, but without success. Finally, through the construction of a channel across the peninsula formed by a loop in the river at this point, the Federals were able to strike the Confederates in the rear and thus cut off their retreat. On April 7 the garrison of about seven thousand surrendered. The island was gradually washed away by the river.

Islands of the Blessed, according to the Grecian mythology, were islands lying far to the westward, where the favorites of Jupiter, rescued from death, lived in perpetual happiness.

Isle of Pines (*Isla de Pinos*), an island of the West Indies, lying 35 mi. s. of the western portion of Cuba, to which it belongs. It is 40

miles by 34, with an area of 1214 square miles. The surface is hilly and is covered with forests of pine, cedar and mahogany. There are some mineral deposits, marble being the most important. The chief industry is cattle raising. The capital is Nueva Gerona, and another town of note is Santa Fé, a health resort. Population, 3199.

Isle of Wight, *wite*. See WIGHT, ISLE OF.

Isle Royale, a group of islands in Lake Superior, forming part of Houghton County, Mich. The most important settlement on the islands is Minong.

Isles of Shoals, *shohlz*, a group of eight rocky islands in the Atlantic Ocean, 10 mi. s. e. of Portsmouth, N. H. The two largest are Appledore, covering 400 acres, and Star, 150 acres. On Wight Island is a revolving light 87 feet above the sea. The islands are much visited by summer tourists.

Isobars, *i'so bahrz*, or **Isobaric Lines**, lines on weather charts, connecting places having equal barometric pressure. Isobars are used in the construction of weather maps and enable meteorologists to obtain a definite knowledge of those regions having the same monthly and yearly atmospheric pressure. From this knowledge they are able to formulate many principles upon which the circulation of the atmosphere is based, and charts of this nature are of the greatest importance in forecasting the weather. See METEOROLOGY.

Isocrates, *i sok'ra teez*, (436-338 B. C.), an Athenian philosopher and orator. He was one of the most famous of the Sophists and contended that man cannot expect to gain truth itself, but must be content with appearances. The orations and essays of Isocrates are among the most famous of Greek prose and were the models on which Cicero formed his style.

Isomerism, *i som'ur iz'm*. It is sometimes found that two different chemical compounds have very different properties, and yet the molecules of the substances are composed of the same atoms and the same number of atoms. Such compounds are said to be isomeric; one is an isomer of the other, and the phenomenon is called isomerism. Such cases are very numerous among the compounds of carbon.

Isothermals, *i'so thurm'alz*, or **Isotherms**, lines used upon maps to connect places having the same temperature. Isothermals are used especially by meteorologists in the construction of weather charts, and enable them to determine the areas of mean monthly and annual tempera-

ture. These lines are also used by the general geographer, as they enable him to convey similar knowledge to his readers. See METEOROLOGY, WEATHER BUREAU.

Ispahan, *ees pa hahn'*, or **Isfahan**, a very ancient city of Persia, for centuries its capital, in the province of Irak-Ajemi, on the river Zendarud, 210 mi. s. of Teheran, the present Persian capital. It was once one of the most important and magnificent cities in the East, but little is now left of its former splendor, the largest part of the city being in ruins. Among the chief structures, some of which are the finest in the East, are a magnificent bridge, having a double row of 34 arches; the palace known as the Tchebel Situn, or Forty Pillars, built by Abbas the Great, and the Mesjid-Shah, or royal mosque. The manufactures are still extensive, including trinkets, firearms, sword blades, glass, earthenware, artistic brass-work, woolens, cottons, velvet and satin. Much opium is grown in the neighborhood; also tobacco and madder. Ispahan is the center of the inland commerce of Persia. Population, about 80,000.

Israelites, *iz'ra el ites*. See JEWS.

Israels, *ees ra ayls'*, JOSEF (1824-), a Dutch genre painter, born in Holland of Jewish parents. He first studied at Amsterdam and later at Paris, under Delaroche. The first important pictures he produced were *The Cradle* and *The Shipwrecked Mariner*, both of which brought him renown. Other works are *Expectation*, *The Frugal Meal*, *Alone in the World*, *David before Saul* and *The Toilers of the Sea*.

Isthmian, is'me an, Canal. See NICARAGUA CANAL; PANAMA CANAL.

Isthmian Games, public games of ancient Greece, so called because they were celebrated on the Isthmus of Corinth. They had a similar character to the Olympian, Nemean and Pythian games. The Greeks in general took part in them, and the principal exercises were boxing, wrestling, foot, horse and chariot racing, and throwing the discus. They were celebrated in April and May, in the first and third year of each Olympiad, and the victors were rewarded with wreaths of pine leaves. The origin of these games was lost in antiquity, but they were generally regarded as having originated in honor of Poseidon (Neptune).

Isthmus, *is'mus*, one of the natural divisions of land, a neck of land by which two continents are connected or by which a peninsula is united

to the mainland. Such are the Isthmus of Panama, connecting North and South America; the Isthmus of Corinth, connecting the Morea with Northern Greece.

Ist'ria, a peninsula of triangular form, projecting into the northeast corner of the Adriatic Sea, part of the Austro-Hungarian dominions. The surface is mountainous, particularly in the north. Istria is rich in wine and oil and has extensive forests, which yield excellent timber. The principal towns are Pola and Rovigno and the capital is Parenzo. Population in 1900, 344,173.

Ital'ian Language. The Italian language is descended from the Latin through the intermediate stage of the so-called "rustic Latin." This is the name given to the corrupt dialects of the uneducated, which arose after the fall of Rome and the consequent disuse of the language as a standard of literature. The dialects had existed before, but they became predominant only under favoring circumstances. In the twelfth and thirteenth centuries, the poets, especially those of Tuscany, employed Italian, the natural result being that their dialect took precedence over the others. Dante (1265-1321) did much to arrange and consolidate the various elements, and thus, long before most other European languages had reached their full development, Italian received substantially the form it has to-day. In the fourteenth century the language was further perfected by Petrarch and Boccaccio, and in the late fifteenth and early sixteenth centuries prose form became fixed and elaborated in the works of Leonardo da Vinci and Machiavelli. Italy has now a uniform written language, but the spoken dialects differ widely, sometimes as much as utterly different tongues. The standard aimed at by educated Italians is a combination of the pure Tuscan dialect with the pronunciation of Rome. The broad vowels and the vast preponderance of vowel-endings give to Italian a particularly musical character. This makes it well adapted for singing. The poetic structure of the language, in choice of words and pronunciation, differs more widely from the prose than that of any other European language. The vocabulary is rich in poetic words and in such as were received from classical sources, but in the expression of material things in modern life it is singularly poor.

It'aly, a kingdom of southern Europe, consisting of the peninsula of the same name, with the islands of Sicily and Sardinia and a number of smaller islands. The continental portion

extends from 38° to 46° 40' north latitude and from 6° 32' to 18° 32' east longitude. Its greatest length is 718 miles and its width varies from 90 to 350 miles. Exclusive of the islands, its area is about 91,000 square miles, and to this the islands add 19,684 square miles. Its total area is thus about the same as that of the State of Nevada. The peninsula of Italy is bounded on the east by Austria and the Adriatic and Ionian seas; on the southwest and south by the Tyrrhenian and Ligurian seas; on the west by France, and on the north by Switzerland and Austria. The dividing line between Italy and Switzerland is considerably to the south of the central part of the great range of the Alps which cuts off Italy from the rest of the continent. With the island of Sicily, from which it is separated only by the narrow Strait of Messina, Italy reaches almost across the Mediterranean Sea and is thus commercially in a very favorable location.

SURFACE AND DRAINAGE. There is in Italy only one large plain, the valley of the Po, in the northern part of the country. This plain is about 37,000 square miles in area and is well-nigh surrounded by a great curve of the Alps. The mountains of the country may be separated into three divisions: the Alps in the northern part; the Apennines, which are about 800 miles in length and extend through the central part of the peninsula, dividing it into two slopes, a western and an eastern (See APENNINES, THE); and the chain which runs parallel to the Apennines in Sardinia and Corsica. Mount Vesuvius, on the Bay of Naples, is the only active volcano on the continent of Europe, while Mount Etna, in the Sicilian continuation of the Apennines, is the loftiest volcano of Europe.

The coast line of the peninsula of Italy is about 2270 miles long, and that of the islands is about 1940. While the country is well watered, there is but one large river, the Po (See Po), which is navigable as far as Turin. Of the other rivers, among which may be mentioned the Tagliamento, the Brenta, the Adige, the Arno and the Tiber, many are but torrents, the beds of which are dry in the summer. Some of the largest mountain lakes of Europe are located in Italy. The Alpine lakes of Maggiore, Lugano and Garda lie only partly in Italy, but Como and Iseo are entirely Italian. The Apennines also contain numerous lakes, many of which seem to have been formed in the craters of extinct volcanoes. Among these Apennine lakes are Trasimeno, Bolsena, Albano and Averno.

CLIMATE. There are in the climate of Italy considerable variations. The southern part of the peninsula, with its arid, burning climate and its sirocco winds, resembles Africa rather than Europe, while the northern parts have a climate which is practically that of central Europe. The latitude of the country (Naples is in the same latitude as New York City) has considerably less to do with the climate than have the local conditions, the nearness to the sea and the protection afforded on the northern boundary by the Alps. In general, the most noteworthy features of the climate consist in the absence of extremes of heat and cold and the clearness of the air. This latter peculiarity accounts for the remarkable blueness of the Italian skies. For the most part Italy is healthful, although there are exceptions in the pestilential marshes, the most notable of which are the Maremma in Tuscany, the Campagna of Rome and the Pontine marshes. The rainfall is considerable during the winter, but irrigation is necessary in most parts of the country.

MINERAL RESOURCES. The mineral industries of Italy are few. Coal is almost entirely lacking, and this prevents the thorough working of such mineral beds as are found. Iron ore is found in some localities. Zinc is mined in Lombardy and Sardinia, and limited quantities of gold, silver and antimony are produced. Sulphur is by far the most important mineral found in the country, and almost all of the world's supply of this mineral is obtained from Italy. The famous Carrara marble, which is largely exported, is found in the Apennines.

AGRICULTURE. Agriculture is distinctly the most important industry of Italy, and the range of latitude and altitude permits the production of all the crops of the temperate regions and many tropical products as well. The length of the warm season in many parts of the country makes possible the raising of two or even three crops during the year. The great plain of Lombardy is the most important agricultural district. Wheat is the principal cereal raised, but there is not enough to supply the domestic need, and large annual importations are necessary. Corn also is raised in all parts of the kingdom, and rice is grown for export, as well as for home consumption. The fruits of Italy are more important than the cereals, and olives, in the production of which Italy leads the world, are the most important agricultural product. Immense quantities of oranges and lemons are grown; almonds are produced in southern Italy and in Sicily, and in the production of wines Italy ranks next to

France. The climate in the northern part is peculiarly adapted to the growth of silkworms, and their cultivation is the most important single industry in the country, Italy being one of the leading countries of the world in the production of silk (See **SILK**).

Little has been done in stock raising, but in the northern part of the country horses and horned cattle are bred to a limited extent.

From the richness of the soil and the favorableness of the climate it might be expected that Italian farmers would constitute a well-to-do class of people. They are, on the contrary, very poor, for the most part, and receive but a small proportional return for their labors. This is accounted for chiefly by the fact that much of the land is owned by wealthy landlords, who rent it out on terms most disadvantageous to the tenants.

MANUFACTURES. The manufactures include silk, which is made chiefly in Lombardy and Piedmont, woollens, straw goods, coral ornaments, mosaics, jewelry, ivory carvings and marble and alabaster products. The Italians have a special aptitude for art work, and the most of the exports of the country consist of such articles. Macaroni, which is produced in large quantities, is largely consumed at home. In the northern districts, dairy products form a large part of the manufactures, and certain varieties of cheese, especially Gorgonzola and Parmesan, are famous.

TRANSPORTATION AND COMMERCE. There are about 10,000 miles of railway in operation in Italy. The railways are organized into two trunk lines, one on either side of the Apennines, known respectively as the Mediterranean and the Adriatic groups. The extensive coast line of Italy and the fact that all Mediterranean ports and most ports of the East are easily reached, have given Italy a large carrying trade, and the country has a large merchant marine.

In its commerce, Italy is behind any other important European power. The imports have of late years somewhat exceeded the exports. In the foreign trade with Italy, Germany ranks first, Switzerland next, then France, Great Britain and the United States. The exports from Italy to the United States consist largely of art goods, Carrara marble, olive oil and straw goods, while the United States sends to Italy cotton, agricultural implements, machinery and hardware.

INHABITANTS AND LANGUAGE. The population of Italy is more homogeneous than that of almost any other large country. There are, of



NAPLES AND MOUNT VESUVIUS

Italy

course, in Italy numerous representatives of all the other European countries, but their proportion to the native Italians is remarkably small. For the language of Italy, see ITALIAN LANGUAGE.

EDUCATION. By a law passed in 1877 compulsory education was provided for all children between six and nine years of age. The law is not strictly enforced in many of the provinces, and the proportion of illiterates is still very high. There are still provinces where three-fourths of the population can neither read nor write. The system of higher schools is remarkably efficient, considering the low educational status of the population in general. There are twenty-one universities, of which the state maintains seventeen. The University of Bologna is the oldest of the state universities, and that at Naples, with an enrollment of over 5000 students, is the largest. There are numerous normal schools and a system of secondary schools comprising both technical and classical schools. There are also more than twenty-five art institutions, besides six government and a number of private musical conservatories.

LITERATURE AND ART. See LITERATURE, subheads *Latin Literature* and *Italian Literature*; PAINTING; SCULPTURE, subhead *Italy*; ARCHITECTURE, subhead *Renaissance Architecture*.

GOVERNMENT AND RELIGION. The government of Italy is a constitutional hereditary monarchy. The royal family is that of Savoy. The king has the power to appoint all officers, may veto any project of law and has the power to grant pardons. He is assisted by a council of responsible ministers. There are at present eleven of these, at the head, respectively, of the departments of interior; foreign affairs; treasury; finance; justice and religion; war; marine; commerce, industry and agriculture; public instruction; posts and telegraphs, and public works. The legislative power is vested in a parliament, which consists of a Senate and a Chamber of Deputies. The Senate is composed of the princes of the blood and an indefinite number of notables appointed by the king for life. Usually the Senate has about 320 members. There are 508 members in the Chamber of Deputies, and they are elected for a term of five years. The only qualification of the franchise is a slight property limitation, or the ability to read and write and to pass an examination in the elementary branches of the school curriculum. Men in the army or the navy cannot vote.

The Roman Catholic religion is the religion of

Italy

almost all of the inhabitants of Italy. It has an importance here which it has not in other countries, because Rome, the capital of Italy, is the center of the Church. According to the last statistics, the Jews and Protestants together in Italy numbered only about 100,000.

COLONIES. Italy's dependencies in Africa, bordering on the Red Sea, extend from Cape Kasar to Cape Dumeirah, and cover an area of about 88,500 square miles. The population, which is mostly nomadic, is estimated at 450,000.

CITIES. The chief cities of Italy are Rome, the capital; Naples, Milan, Turin and Palermo, all of which are described under their respective titles.

HISTORY. The ancient history of Italy belongs properly under that of Rome. Before the period of Roman supremacy, the country was peopled by various Italic tribes, among which were the Etruscans, or Tuscans, the Umbrians, the Sabines and the Latins. The last-named became supreme and gave their name to the ancient race and language. With the fall of Rome, in 476 A. D., begins the history of Italy proper. The invading barbarians proclaimed their leader Odoacer king of Italy, but in 493 they were overthrown by Theodoric the Great, king of the Ostrogoths, who united the whole peninsula under Gothic rule and proved himself a wise and benevolent king. Italy had not seen such prosperity since the earlier glory of the Roman state.

In 552 the Ostrogoths were vanquished by the army of the Eastern emperor Justinian, under the famous general Belisarius, and Italy became an exarchate of the government at Constantinople. After the recall of Narses, the first governor, the Lombards, a Germanic tribe, invaded Italy, introduced Germanic feudal institutions and greatly modified the political and social life of the country. About the middle of the eighth century, the Lombards threatened Rome, but were defeated by Pippin, king of the Franks, whose aid had been asked by the pope. Certain territory was given to the pope by Pippin, and this gift was confirmed by Charlemagne, who conquered the Lombards and annexed their country to the Frankish kingdom in 774. This gift to the pope was the beginning of the temporal power of the Church.

In 800 Charlemagne was crowned Roman emperor by the pope, and the assumption of this title led to the claims of the German emperors in Italy during the following centuries. By the Treaty of Verdun (843), Italy fell to

Lothair, and for over a century anarchy reigned throughout Italy, but in 951 Otho the Great reduced the Lombard king to vassalage, and in 961 Otho himself assumed the crown of the Lombards. In the following year he was crowned emperor, thus founding the Holy Roman Empire. The rule of the Germans was never acceptable to the Italians, and from the beginning of the eleventh century frequent revolts occurred against the German emperors, who with difficulty maintained their authority. The Lombard kingdom was gradually resolved into city states, such as Milan, Genoa, Pisa, Florence and Venice. During the eleventh and twelfth centuries arose the famous factions of the Guelphs and the Ghibellines (See GUELPHS AND Ghibellines), and the emperor Frederick I was compelled to relinquish all rights in the cities of the Lombard League (1183). In the latter half of the thirteenth century the German dynasty was completely overthrown, and the kingdom of the Two Sicilies was secured by Charles of Anjou. Italy was at this time prosperous, but this prosperity was marred by the continued feuds and rivalry of the Guelph and Ghibelline factions.

The Guelphs continued victorious and defeated the attempt of Henry VII to restore German supremacy in Italy (1312). This party, however, was torn by disputes and gradually succumbed to petty tyrants. From the middle of the fourteenth century to the end of the fifteenth, the history of Italy as a whole ceases, and we have only the annals of several powerful cities and the famous families who ruled them (See VENICE; FLORENCE; GENOA; MILAN; NAPLES; ROME; SICILY; PAPAL STATES). The smaller states dwindled into insignificance.

During the early sixteenth century, Italy was the scene of the struggles between France and the German emperors, now represented by the Austrian House of Hapsburg. These struggles began in 1494 with the attempt of Charles VIII of France to conquer Naples. The Battle of Pavia (1525) decided the struggle finally for the German emperors, who thereafter appointed rulers over the several states. Italy enjoyed comparative peace for one hundred fifty years, during which some progress was made toward national consolidation. Charles V in 1535 secured Milan and Naples for Spain, but in the early eighteenth century Austria acquired both, together with Sardinia, which was later exchanged for Sicily. The condition of Italy,

nationally, was one of apathy and decay down to the French Revolution.

In 1793 Italy attempted to join the coalition against France and as a result was reduced to the condition of a dependency. By the Treaty of Campo-Formio in 1797 Napoleon surrendered Venice to Austria and transformed the remainder of Italy into republics. In 1806 Naples was made a kingdom for Joseph Bonaparte, who was succeeded two years later by Murat. From 1809 until 1814 Napoleon's supremacy in Italy was undisturbed.

The Congress of Vienna in 1815 left Italy almost entirely in the hands of Austria and the papacy, and the wishes of the Italian people for unity and independence were hopelessly crushed by this restoration of the Austrian and the papal power. Conspiracies and secret societies directed against the foreign rule sprang up almost immediately. The liberal concessions made by Charles Albert after his accession in 1831 to the throne of Sardinia laid the foundation for the ultimate union of Italy under his house. Mazzini made vigorous pleas for national unity, calling upon Charles Albert to act as liberator for his country. The revolution in France in 1848 increased the discontent in Italy, and insurrections were common throughout the country. Naples, Sardinia and Rome were forced to grant constitutional rights, and in Milan the people rose against Austrian rule and compelled the foreign troops to retreat. Charles Albert now entered Lombardy at the head of his army. The pope at first supported the movement, and his subsequent change of position weakened the national cause and the fighting force. Charles Albert was defeated at Novara early in 1849, and reaction was triumphant throughout southern and central Italy. Only in Sardinia were the liberal reforms continued under the new king, Victor Emmanuel (See VICTOR EMMANUEL II; SARDINIA, KINGDOM OF).

Toward the close of 1858 it became evident that Sardinia and France were preparing to ally themselves against Austria, and early in the following year Victor Emmanuel proclaimed his intention to aid in freeing Italy from the Austrian yoke. War began in April, 1859, and the Austrians, after a few smaller engagements, were routed in the great Battle of Magenta, June 4, and compelled to relinquish Milan and northwestern Lombardy. They were again defeated at Solferino, after which the French emperor, fearing the interference of Prussia, suddenly concluded the Peace of Villafranca. This proposed

a confederation of the Italian states under the pope, but it was rejected by all Italy. In 1860 the duchies of Tuscany, Parma and Modena, whose sovereigns had been driven out, declared for annexation with Sardinia, and Victor Emmanuel was proclaimed king of Italy, March 17, amid great rejoicing. Savoy and Nice were ceded to France to indemnify her for her share in the war. In May began the conquest of the Two Sicilies by Garibaldi (See GARIBALDI, GIUSEPPE), and in November, Victor Emmanuel formally annexed the provinces which had composed this kingdom. In the Seven Weeks' War between Austria and Prussia, Italy was the ally of Prussia, and after the defeat of Austria, Venetia was added to the kingdom of Italy by treaty. In the following year the Italian volunteers under Garibaldi attacked Rome, but Napoleon III refused to permit the annexation of Rome to the kingdom of Italy. When, in 1870, France was forced to withdraw her troops from Rome, for use in the war against Prussia, the government troops entered the city, and in July, 1871, Rome became the capital of United Italy. In 1878 Humbert, son of Victor Emmanuel, succeeded to the throne, and he was succeeded in 1900 by his son, Victor Emmanuel III. Affairs in Italy have been generally quiet since 1871. The population in 1901 was 32,475,253.

Consult Mrs. E. D. R. Bianciardi's *At Home in Italy*; G. S. Hillard's *Six Months in Italy*; W. D. Howells's *Italian Journeys*; Edward Hutton's *Italy and the Italians*.

Itch, a contagious skin disease, appearing as small, watery sacks on the skin, accompanied with an irritation which inclines the patient to rub or scratch. It usually appears first between the fingers and on the lower side of the wrist. The cause is a small insect, or mite, which burrows under the cuticle. A mixture of lard and sulphur applied externally will kill the insects and cure the disease.



ITCH MITE

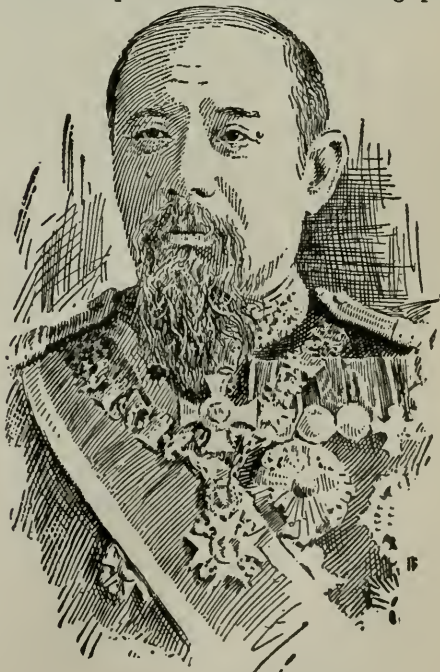
Much magnified.

Ith'aca (now Thiaki), one of the Ionian Islands, west of Greece, between the mainland and Cephalonia. It is 14 miles long and not more than 4 miles broad. It is rugged and uneven and is divided into two nearly equal parts, connected by a narrow isthmus. The inhabitants are industrious agriculturists and mariners. Ithaca is celebrated as the home of Ulysses, in Homer's *Odyssey*. Schliemann has recently made important excavations and has

identified several sites mentioned by Homer. Vathi, the modern capital, trades largely in oil, wine, raisins and currants. Population, 11,000.

Ithaca, N. Y., the county-seat of Tompkins co., 60 mi. s. w. of Syracuse, at the head of Cayuga Lake, on the Lackawanna, the Lehigh Valley and other railroads. The city has an especially beautiful location on the shores of the lake and near numerous gorges and waterfalls. Taughan-nock Falls are 215 feet high. Cornell University, which is located here, has one of the most beautiful college campuses in the world, lying 400 feet above the lake and overlooking the city and the water (See CORNELL UNIVERSITY). The Cascadilla Preparatory School, Ithaca Conservatory of Music and Renwick Park are other features of interest. Ithaca is in a productive farming region and has an extensive coal trade. The manufactures include typewriters, machinery, agricultural implements, firearms, glass, wall paper and other articles. The first settlement was made in 1789, and it was variously called The Flats, Sodom and The City, until Simon DeWitt gave the place its present name in 1806. Population in 1905, 14,615.

Ito, *ee'to*, HIROBUMI, Marquis (1840-1909), a celebrated Japanese statesman, the leading spirit



MARQUIS HIROBUMI ITO

in the reforms in Japanese civilization and methods of government. He visited the United

States in 1871 to study our system of coinage, and on his return he established the Japanese mint. He was minister of public works in 1873, and he was prime minister for four terms, the last ending in 1901. He wrote Japan's present constitution and was a leader in the war with China, also in the war with Russia. In 1908 he was appointed Japanese Resident General of Korea, and was virtually ruler of the country. Count Ito was assassinated by a native of Korea at Harbin Oct. 25, 1909. See JAPAN, subhead *History*.

Iturbide, *ee toor bee'da*, AGUSTIN DE (1783-1824), an early emperor of Mexico, the son of a Spanish nobleman, born at Valladolid, Spain. He entered the Spanish army in Mexico in 1798, fought against the insurrectionists in 1810 and gained a high post under Spain for his loyalty and bravery. He quit the military service in 1816, but, after the proclamation of the constitution in 1820, as commander of the Spanish army in the south he intrigued with the revolutionary leaders for the acceptance of the so-called "Plan of Iguala," which contemplated independence of Spain under a prince of the royal family. He made a triumphal march to the City of Mexico, where he compelled the viceroy to accept the plan. Pending negotiations with the royal family, he was placed at the head of a ministry and became commander in chief of the army. The national congress was held, but was rent with factional strife, and Iturbide, being accepted by the party in favor of the monarchy, was proclaimed emperor as Agustín I in July, 1822. His harsh repressive measures led to a rebellion under Santa Anna, and Iturbide abdicated, sailing for Italy. In the following year, he returned to Mexico, where a republic had been meantime established, was immediately arrested and was executed at Patola, July 19. See MEXICO, subhead *History*.

I'van III (Russian pronunciation, *e vahn'*), called the *Great* (1440-1505), grand prince of Muscovy, came to power in 1462. He greatly enlarged his hereditary possessions and married Sophia, niece of the last Byzantine emperor, thus introducing the double-headed Byzantine eagle into the Russian coat of arms. He may be regarded as the real founder of the Russian Empire.

Ivan IV, called the *Terrible* (1530-1584), became grand duke of Russia in 1533. In 1547 he assumed the title of czar. He did much to civilize and improve his people, introduced learned men, artists and mechanics into Russia

and concluded a commercial treaty with England. Nevertheless, the name *Terrible* was well earned, for in war and in dealing with insurrections he was most cruel and blood-thirsty.

I'vory, the bone-like substance of which the tusks of the elephant and the teeth or tusks of the hippopotamus, walrus and narwhal are composed. Ivory is esteemed for its beautiful white color, its hardness, the fineness of its grain and its susceptibility of a high polish. That of the African elephant is most esteemed by the manufacturer for its density and whiteness. It is used as a material for knife handles, piano-forte keys, billiard balls and many other small articles. The ivory of the hippopotamus is preferred by the dentist, being free from grain and much harder and of a purer white than that of the elephant. The shavings and sawdust of ivory may by burning be converted into a black powder, named *ivory black*. Ivory may be stained or dyed; a black color is given it by a solution of brass and a decoction of logwood, a green, by a solution of verdigris, and a red by boiling with Brazil wood in limewater. The use of ivory, chiefly for ornamental purposes, was well known in early ages. Among the Greeks it was employed for statuary purposes. The medium weight of an elephant's tusk is sixty pounds, but some are found weighing 170 pounds. Ivory is an important article of African trade, and the number of elephants annually killed to supply the demand has so reduced the herds of these animals that there is danger of their becoming exterminated (See ELEPHANT). Celluloid and vegetable ivory are extensively used as substitutes for ivory.

Ivory, **VEGETABLE**. See IVORY PALM.

Ivory Coast, a French colony in West Africa, lying between Liberia on the west and the British Gold Coast Colony on the east, and between the Senegal on the north and the Gulf of Guinea on the south. It has an area of about 116,000 square miles and a population of about 2,000,000, of which the Europeans number less than 300. The seat of government is now Bingerville, formerly called Adjamé. The principal centers of population and commerce are Grand Bassam and Assinie. The climate is extremely hot and unhealthy. Maize, plantains, bananas, pineapples and other fruits, besides coffee, are cultivated with success, and there are considerable exports of mahogany, rubber and cocoanuts. There is a deposit of gold near Grand Bassam. A railway

Ivory Palm

is under construction from the coast inland, of which about 100 miles had been completed at the close of 1905. There are also telephone and telegraph communication between the principal cities. The French gained possession of the colony about 1843, but for forty years they paid little attention to it. Since 1883 they have undertaken a consistent policy of development.

Ivory Palm, a low, palm-like plant, native of the warm parts of South America. It has



IVORY PALM

a creeping trunk, with immense terminal leaves, and bears a cluster of large fruits, weighing, when ripe, about twenty-five pounds. Each fruit contains from six to nine seeds as large as hens' eggs, the kernels of which are close-grained and very hard, resembling ivory in texture and color. These nuts are exported under the name of *vegetable ivory*, and they are extensively used in the manufacture of buttons, knobs for doors, umbrella handles and numerous other small articles.

Ivy, a climbing plant that grows wild in Great Britain and on the continent of Europe. The leaves are smooth and shining, varying much in form, from oval entire to three and five-lobed; and their perpetual greenness gives the plant a beautiful appearance. The flowers are greenish and inconspicuous and are suc-

Izard

ceeded by deep green or almost blackish berries. The common English ivy is very plentiful in Great Britain, growing in hedges and woods and on old buildings, rocks and trunks of trees. Several varieties of ivy are grown in American gardens, among which is the Virginia creeper, sometimes called the American ivy. The poison ivy and ground ivy are not true vines. The ivy attains a great age and its main stems become several inches thick. The wood is soft and porous, and in Switzerland it is much used for making various useful articles. The ivy has been celebrated from remote antiquity and was held sacred in some countries, as Greece and Egypt.

Ixi'on, in Greek mythology, king of the Lapithae in Thessaly, who for his wickedness was punished in the lower world by being tied to a perpetually revolving fiery wheel.

Iz'ard, GEORGE (1776-1828), an

American soldier, born at Richmond, England, the son of Ralph Izard, a revolutionary patriot in America. He graduated at the College of Pennsylvania in 1792, and later studied in England, Scotland and Germany. He returned to America in 1797, having previously been appointed to a commission in the artillery service in the United States army, and was placed in command of important forts. He resigned from the army in 1803, but reënlisted at the opening of the War of 1812 and attained the grade of major general. He served on the frontier under generals Wade Hampton and Jacob Brown, but gained popular disapproval by his conduct. In 1825 he was appointed governor of Arkansas Territory.



IVY



J, the tenth letter in the English alphabet. As a character it was formerly used interchangeably with *i* as either vowel or consonant, and the separation of these two letters in English is of comparatively recent date. Gradually *i* came to represent the vowel sound and *j* the consonant sound. In form also *j* is a modification of *i*. In English *j* has but one sound, a combination of *d* with *zh*, identical with the soft sound of *g*.

Jab'iru, a large tropical American stork, sometimes appearing in the Southwestern United States. The feathers are white, but the head and neck are naked and covered with a black skin. The jabiru is the only true American stork.

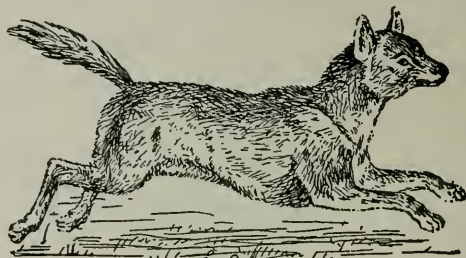
Jab'oran'di, the South American name of several different medicinal plants which have marked power to produce sweating. However, as their poisonous properties are strong, they are not used internally to any great extent and are used only with extreme caution.

Jacana, *jak'a na*, the common name of certain wading birds, which have long toes and very long nails, so that they can stand and walk on the leaves of aquatic plants when in search of their food. They live in the marshes of hot climates and are related to the plover. The Indian species, which is called the *surgeon bird*, is brownish above, purplish below, has white head and wings and four very long, dark brown, curved tail-feathers.



JACANA

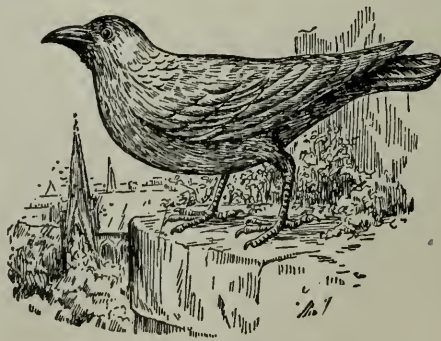
Jackal, *jak'awl*, an animal of the dog genus, resembling a dog and a fox, a native of Asia and Africa. The general color is a dirty yellow. The jackals are gregarious, hunt in packs and



JACKAL

rarely attack the larger quadrupeds. They feed chiefly on carrion and are nocturnal in their habits. Jackals are timid animals and may be easily tamed. The *common jackal* is the most widely distributed. Another species, the *black-backed jackal*, whose fur is highly prized, is found in southern Africa. This species is much more highly colored than any of the others.

Jack'daw, a small British crow, with comparatively short bill and whitish eyes. It nests



JACKDAW

in towers, spires and other elevated places, often in the midst of large towns. Jackdaws are very sociable, intelligent birds, and being easily tamed, they make entertaining pets.

Jack-in-the-pulpit

Jack-in-the-pulpit or **Indian Turnip**, a common plant that blossoms in early spring in low grounds or along streams. The flowers come from the flattish, turnip-shaped root, the juice of which is very acrid, or biting. The flowers are very small and are grouped closely together at the base of the rather long, club-



JACK-IN-THE-PULPIT

shaped growth. Around the whole is wrapped a leaf that is greenish on the outside and striped with purple or green within. Later in the season all parts, excepting the stem and the bunch of scarlet berries, wither.

Jack-o'-lantern. See **IGNIS FATUUS**.

Jack' Rab'bit. See **HARE**.

Jack'son, **MICH.**, the county-seat of Jackson co., 76 mi. w. of Detroit, on the Grand River and on the Michigan Central, the Lake Shore & Michigan Southern, the Grand Trunk, the Cincinnati Northern and other railroads. The city is in an agricultural region and is an important railroad center. It has a considerable trade in agricultural produce and implements, and there are large railroad shops and extensive manufactures of carriages, wagons, machinery, flour, clay products and paper. The state prison is located at Jackson. The place was settled in 1829, but it did not grow rapidly until after the construction of the Michigan Central railroad. Population in 1904, 25,300.

Jackson, **MISS.**, the capital of the state and the county-seat of Hinds co., 40 mi. e. of Vicks-

Jackson

burg, near the geographical center of the state, on the Pearl River and on the Illinois Central, the Queen & Crescent and several other railroads. The city has handsome public buildings, of which the most important are the state capitol, the governor's mansion, the Federal building, the state library and the state institutions for the blind, deaf, dumb and insane. Millsaps College (Methodist Episcopal) and Bellhaven College for young ladies are located here. Good railroad connections and river navigation furnish excellent transportation facilities. A large amount of cotton is raised in this section, and the important industries are the cottonseed oil mills, wood-working establishments and manufactories of fertilizers, agricultural implements and other articles. The place was settled about 1828 and was incorporated in 1840. During the Civil War the city was occupied by the Union forces under General Grant in 1863 and was partly destroyed by General Sherman in 1864. Population in 1900, 7816.

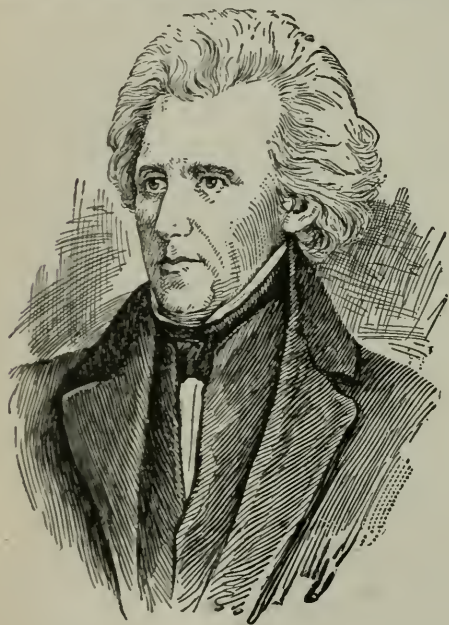
Jackson, **OHIO**, the county-seat of Jackson co., situated 44 mi. n. e. of Portsmouth, on the Detroit Southern, the Baltimore & Ohio Southwestern and several other railroads. Coal and iron mines of considerable importance are located in the vicinity, and the town has blast furnaces, flour mills, planing mills and woolen mills. Population in 1900, 4672.

Jackson, **TENN.**, the county-seat of Madison co., 85 mi. n. e. of Memphis, on the south fork of the Forked Deer River and on the Illinois Central, the Mobile & Ohio and other railroads. The city is an important trading center for a rich farming region. It has an extensive cotton trade and contains cotton mills and manufactories of engines, furniture, clothing, carriages and other articles. The Southwestern Baptist University, Lane University and the Memphis Conference Female Institute are located here. Jackson was settled in 1810 and was incorporated in 1854. During the Civil War it was held successively by the Union and Confederate forces and was used as a base for operations. Population in 1900, 14,511.

Jackson, **ANDREW** (1767-1845), an American statesman, seventh president of the United States, born in North Carolina. His father, a Scotchman, died before the birth of his child, leaving him to the care of a poor but indulgent mother. In his fourteenth year, near the close of the American Revolution, Andrew joined the regiment of volunteers to fight in the cause of independence. He lost two brothers in the

struggle and finally retired from military service, devoting himself intermittently to the study of law. He was not a great lawyer, but as public prosecutor in the district now known as Tennessee, he gained many friends by his honest and resolute policy. He became a judge of the district supreme court, representative in Congress and United States senator, but resigned the last office after only a few months.

When in 1812 war was declared against England, Jackson offered his services at the head of 2500 Tennessee militiamen and was made major general of volunteers. He went to the front, but after a few months was dismissed without pay for himself or his men and



ANDREW JACKSON

returned to Tennessee. In 1813 he was again commissioned, and he defeated the Creek Indians, who had long been wasting the country with fire and sword. He was then made major general in the regular army and soon after attacked and captured Pensacola, without orders. In January, 1815, he established his military reputation by the repulse of an elaborate British attack upon New Orleans. His arbitrary proceedings, however, aroused disapproval, and he was condemned to pay a heavy fine, which, however, was remitted thirty years later by Congress. In 1817 he again proceeded against the Seminole Indians, but again incurred popular disapproval by excessive severity and disregard

of international usage in the execution of two British subjects in Florida.

In 1821 he was appointed governor of the newly acquired Territory of Florida, and two years later he was elected to the United States Senate from Tennessee, at the same time being nominated for president by the state legislature. The contest for the presidency was exceedingly bitter, and four candidates received electoral votes, Jackson, John Quincy Adams, William H. Crawford and Henry Clay, in the order named. No one had a majority, however, and the House of Representatives elected Adams. Four years later, in one of the most bitter contests in American history, Jackson was elected, and he was reelected in 1832 over the Whig candidate, Henry Clay.

The election of Jackson to the presidency marks an important epoch in American political history, as he was the first real representative of the so-called "common people." During his administration the spirit of democracy was given a tremendous impulse throughout the country. The first important event during his term was his removal of public officers upon the ground of their political affiliations, in accordance with the doctrine enunciated by his friend Marcy, that "to the victors belong the spoils of the vanquished" (See CIVIL SERVICE AND CIVIL SERVICE REFORM). He also vetoed the United States Bank charter and thus precipitated a long contest; and he crushed the nullification movement in South Carolina by a prompt and vigorous display of Federal authority. During the contest over the national bank, which extended throughout his second administration, a resolution of censure was passed upon President Jackson, which was not repealed until 1837. It was during Jackson's administration also that the question of slavery first became a prominent factor in politics.

Upon retiring from office, he returned to his home near Nashville, which he called the "Hermitage." Jackson was one of the most forceful personalities in American history. Though not a deep thinker, when action was called for he administered affairs with vigor and discretion. Consult Sumner's *Andrew Jackson*, in American Statesmen Series; also Parton's *Life of Andrew Jackson*.

Jackson, HELEN FISKE HUNT (1831-1885), an American novelist and poet. She was born at Amherst, Mass., was educated in Ipswich and New York and at twenty-one married Major Edward B. Hunt. Her first poems, written at



THOMAS J. (STONEWALL) JACKSON

Newport, R. I., after her husband's death in 1863, and signed "H. H.," were encouragingly received. She remarried in 1875. Later poems, humorous sketches of travel, two novels and various stories for children are included in her works, but she is best known for her impassioned appeal for the Indian in *A Century of Dishonor*, and *Ramona*. To finish this great story, in which she was to voice the Indian's wrongs, she fought heroically against the disease which in the next year caused her death.

Jackson, THOMAS JONATHAN (1824-1863), more commonly known as "Stonewall" Jackson, an American soldier, born at Clarksburg, Va. (now W. Va.), of Scotch-Irish parentage. He early showed marked qualities of leadership, was elected sheriff at the age of eighteen and at about the same time entered West Point, where he graduated in 1846 with honors, in a class which included McClellan, Pickett and A. P. Hill. He entered the army immediately, served in the Mexican War and was brevetted captain and major for gallantry in action. He resigned from the army in 1851, became professor of military tactics in Lexington Military Institute. Here he remained until April, 1861, never a great success as an instructor, for he lacked the ability to inspire interest in his subjects and his eccentricities of manner were such that the cadets were continually laughing at him. He was, however, a powerful influence for good in the community as an ardent Presbyterian and gave much of his time and money even while in active service to the betterment of the negroes who belonged to his class in Sabbath School. It is interesting to know that after the war, when a bronze monument was to be raised to his memory in Lexington, the first contribution came from the colored Baptist Church. Jackson was a union man and did not favor secession, but when volunteers were called for to coerce the States he said, "I have longed to preserve the Union and would have been willing to sacrifice much to that end. But now that the North has chosen to inaugurate war against us, I am in favor of meeting her by drawing the sword and throwing away the scabbard." He was commissioned colonel in the Virginia forces and later placed in command of the Virginia brigade which afterwards became so famous under him. At the battle of Bull Run, when Jackson was seen fighting valiantly against what seemed to be overwhelming odds, General Bee called out, "There stands Jackson like a stone wall." The phrase was taken up and from that time on

Jackson was known as *Stonewall* and his troops as the *Stonewall brigade*. He was promoted to be major general in September of the same year, and in a campaign in the Shenandoah Valley against General Banks, he won brilliant victories at McDowell and Winchester and completely baffled the Federal commanders.

In June, 1862, Jackson joined Lee in the defense of Richmond against McClellan and took a prominent part at the battles of Mechanicsville and Malvern Hill, and, after McClellan's withdrawal, at Cedar Mountain and the second Battle of Bull Run, against General Pope. His force was conspicuous in Lee's first invasion of the North, and at Antietam and Fredericksburg he did yeoman's service for the Confederate army. In May, 1863, at Chancellorsville, he fell upon Hooker's right flank under Howard and almost destroyed a full corps. At nine o'clock in the same night he was accidentally shot by his own men, while reconnoitering, and died May 10. His loss was a severe blow to the Confederate cause, for he had been a tower of strength in every campaign. He combined a deeply religious nature with the highest military talents, beginning every battle with prayer and giving thanks to God after every victory. He was without doubt the greatest lieutenant upon either side in the Civil War, but was never tried in command of large forces. Consult Hovey's *Stonewall Jackson*.

Jacksonville, FLA., the county-seat of Duval co., situated 165 mi. e. of Tallahassee, on the w. bank of the Saint Johns River, on the Southern, the Atlantic Coast Line, the Florida East Coast and other railroads. The ocean beaches near here are among the finest on the Atlantic coast, and the city has long been a popular winter resort. There are many fine churches, among which the Snyder Memorial, Saint John's Episcopal and the Church of the Good Shepherd are especially noteworthy. There are also several charitable institutions. Other prominent structures are the Federal building, the armory, Duval High School, the board of trade, the Masonic temple and several club houses and hotels.

The city is an important trading port and ships large quantities of lumber, shingles, cross-ties, naval stores, turpentine and garden produce. The principal manufacturing establishments are lumber mills, ice plants, foundries, brick and tile works, shipyards and various factories. The place was settled in 1822 and was named in honor of Andrew Jackson, the

first territorial governor of Florida. It was incorporated in 1833. In 1901 a fire destroyed a great number of buildings, causing a loss of about \$12,000,000, from which the city has completely recovered. Population in 1900, 28,429.

Jacksonville, ILL., the county-seat of Morgan co., 34 mi. w. of Springfield, on the Chicago, Burlington & Quincy, the Wabash and other railroads. The Illinois College, which was founded here in 1829, is the oldest institution of higher education in the state. It has absorbed Jacksonville Female Academy and also includes the Whipple Academy and a conservatory of music. The city is the seat of the Illinois Woman's College and of state institutions for the insane, the blind and the deaf and dumb; also of a Carnegie public library, two hospitals, a park and county fair grounds. Other prominent buildings are the city hall, the courthouse and the high school. The industries include railroad shops and wool, flour and paper mills, and there are also considerable exports of live stock. The place was settled as the county-seat about 1825 and was incorporated as a city in 1867. Population in 1900, 15,078.

Jack's stones, a game common among children, played with small pebbles or with iron pieces made specially for the purpose. The game consists in tossing or catching one or more of the stones in various ways, after having touched, moved or caught up the other stones which lie on the ground. Many different forms of the game exist, and the different steps are known by fanciful names.

Jack's straws, a game played with many little sticks of wood, from four to six inches long and of generally uniform size, carved in the shape of implements and tools. The sticks are thrown together in a heap, and each player, in turn, extracts with a tiny hook as many of the straws as possible (one at a time), without causing any others to move. The player having the greatest number of straws when all have been removed from the table is declared the winner.

Ja'cob, the son of Isaac, the grandson of Abraham, the last of the Jewish patriarchs and the true ancestor of the Jews. Having craftily obtained from the blind and infirm Isaac the blessing of the firstborn in place of his brother Esau, he was obliged to flee from the anger of his brother and took up his abode with his uncle Laban. Here he served twenty years and obtained Leah and Rachel as his wives. On

his return to Canaan he was met by an angel, with whom he wrestled all night, and having gained the victory was thereafter named *Israel*, that is, *the hero of God*. Hence the Hebrews, from him, are called Israelites. Jacob died, aged 147 years, about 1860 B. C., and according to his wish was buried in the tomb of Abraham, before Mamre in Canaan.

Jac'obins, the most famous of the clubs of the French Revolution. When the States-General assembled at Versailles in 1789, a club was formed by a number of deputies from Brittany, called the *Club Bréton*. On the removal of the court and national assembly to Paris it acquired importance and rapidly increased. It adopted the name of *Société des Amis de la Constitution*, but as it met in a hall of the former Jacobin convent in Paris, it was called the Jacobin Club. It gradually became the controlling power of the Revolution, and its influence spread over France, hundreds of branch societies being established. The Jacobins were foremost in the insurrectionary movements of June 20 and August 10, 1792, and they originated the formidable Commune of Paris. For a while they ruled supreme, and the Convention itself was but their tool. Robespierre was their most influential member; they ruled through him during the Reign of Terror and were overthrown after his downfall in 1794. The term *Jacobin* is now often used to designate any one holding extreme views in politics.

Jac'obites, Christians in the East, who were united by a Syrian monk, Jacobus Barbadaeus (578), during the reign of Justinian, into a distinct religious sect. The Jacobites, so styled from their founder, number now about 80,000. They are governed by the patriarch of Antioch, whose appointment must be confirmed by the sultan, and who has under him eight metropolitans and three bishops. The metropolitan of Jerusalem ranks higher than the others, and with the patriarch he lives at the monastery near Mardin. The doctrine of the single nature of Christ is common to them and to the Copts and Abyssinians; but in other respects they differ little from the orthodox Greek Church.

Jacob Tome Institute, a school for secondary education, established at Port Deposit, Maryland, in 1894, by Jacob Tome. It has a kindergarten department, a junior department for boys and girls, a high school for girls and a boarding school for boys. There are about 50 teachers and 600 students. The institute has an endowment of over \$2,000,000.

Jacotot, *zhah ko to'*, JEAN JOSEPH (1770-1840), a French educator, born at Dijon. While serving as lecturer on the French language at Louvain, he was compelled to give lectures in French to students who were wholly unacquainted with the language, and the difficulties which he experienced led him to work out a system of teaching, peculiarly his own. The central idea of his method rests upon the correlation of all knowledge. He believed that a single fact learned thoroughly, first by observation and afterwards by contemplation, becomes the spur and possibly the key to the acquisition of other facts. According to Jacotot's idea, by starting with a single truth one is able to extend his knowledge to nearly all subjects. His method was very successful and has been in use in Europe and America, where it has exerted great influence toward the correlation of subjects.

Jacquard, *zha kahr'*, JOSEPH MARIE (1752-1834), a French inventor, born in Lyons. He was the inventor of the famous machine for figured weaving, which is named after him. His parents were silk weavers, and he learned the same trade. After a long period of hardship Jacquard made his name famous by the invention of his new loom, which was publicly exhibited in 1801. He endeavored to introduce it into general use in Lyons, but was mobbed, and almost lost his life. Ultimately, however, his invention was bought by the French government, and he was able to spend the latter part of his life in comfortable independence. See WEAVING.

Jacquard Loom. See WEAVING.

Jacquerie, *zha kre'*, INSURRECTION OF THE, the name given to the rising of the French peasantry against their lords in the middle of the fourteenth century, after the Battle of Poitiers. They committed every atrocity, particularly in the northeast of France. They were at length quelled and the nobles retaliated by enormities as great as those which the peasants had practiced earlier. The term *Jacquerie* is derived from *Jacques Bonhomme*, a familiar epithet for a peasant.

Jade, a variety of hornblende, containing calcium, magnesium and silica. It is also called *nephrite*. It is usually of a color more or less green, of a resinous or oily aspect when polished, hard and very tenacious. It has been used by rude nations for their weapons and implements and has been and is highly prized for making carved ornaments in China, New

Zealand and among the native races of Mexico and Peru. Jade axes are common among uncivilized races, and prehistoric specimens have been found in Europe, though the stone itself is not found there. A similar stone, more properly called *jadeite*, is frequently confounded with jade proper. It is a silicate of aluminum and sodium.

Jaffa, *yahf'jah*, or **Yafa**, a city of Palestine, situated on the Mediterranean, 31 mi. n. w. of Jerusalem, with which it is connected by railway. The site of the city slopes toward the sea. The town contains a number of buildings of considerable note because of their architecture. Among them are mosques and churches, also several hospitals and hotels. The commerce is of considerable importance, the exports consisting of fruits, wool, wine, sesame and a few manufactures. Being the nearest port to Jerusalem, its tourist trade is large. Ancient Joppa was the seaport of Jerusalem in early days, and it is probable that through this port came most of the wealth that Solomon received from his seafaring expeditions. Population, estimated at 40,000.

Jagannatha, *jug'a nahl'a*. See JUGGERNAUT.

Jaguar, *ja gwahr'*, a member of the cat family, found in South and Central America. It is not quite as large as a tiger and is of a yellowish or fawn color, marked with large dark spots and rings, the latter with a dark spot in the center of each. Some species are nearly black. The jaguar rarely attacks man unless hard pressed by hunger or driven to bay. The favorite haunts are the forest swamps of the Amazon. The skin is valuable, and the animal is hunted by the South Americans in various ways. (See illustration on next page.)

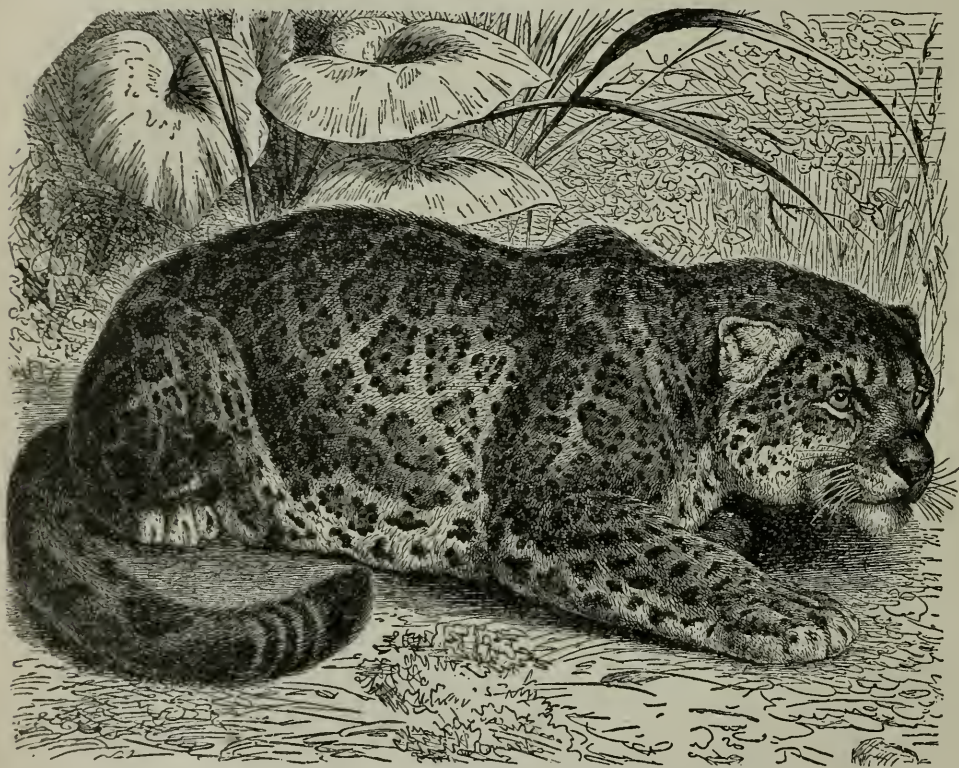
Jahn, *yahn*, FRIEDRICH LUDWIG (1778-1852), the founder of the German *turnverein*, noted for his introduction of physical training into Germany. He was born at Lanz and educated at the universities of Halle and Greifswald. At first his work met with great opposition, but he finally secured the approval of the emperor and one of his ministers. He was active in the war of 1813, after which he devoted his time to the development of physical culture throughout the country. In 1848 he was made a member of the national assembly and was one of the leaders in securing a united Germany. The *turnvereins* established through his influence still exist.

Jail Fever, a dangerous disease once very prevalent in prisons. See TYPHUS FEVER.

Jainas, *ji'nas*, or **Jains**, a Hindu religious sect, which, from the wealth and influence of its members, forms an important division of the population of India. The sect was very numerous and important in the eighth and ninth centuries of the Christian era, and they have left many monuments of their skill and power in the fine temples built in different parts of the country. Jainism was an offshoot of Buddhism, with which it has many leading doc-

palace, the Sanskrit College, the meteorological observatory and the Mayo Hospital. The city also contains a number of public gardens, noted for their beauty. The leading industries are the manufacture of jewelry and textiles. Jaipur is an important commercial center. Population in 1901, 160,167.

Jalandhar, *jul'an dur*, or **Jullundur**, a town of India, capital of a district of the same name, in the Punjab, 75 mi. e. of Lahore. It



JAGUAR

trines in common, but from which it is distinguished by its recognition of a divine personal ruler of all and by its political leanings toward Brahmanism. The Jains reverence certain holy mortals, who have acquired by self-denial and mortification a station superior to that of the gods; and they manifest extreme tenderness for animal life.

Jaipur, *ji poor'*, or **Jeypore**, a city of India, the capital of the native state of Jaipur, situated 148 mi. s. w. of Delhi. It is a modern city in every respect and is considered one of the best-built cities in India. It has municipal waterworks and is illuminated by gas. Among the public buildings of importance are the

is in a rich agricultural region, and it has a large cantonment. Population, 67,735.

Jal'ap, a twining plant of the *Convolvulus* order, with heart-shaped leaves and elegant deep pink flowers. It grows native on the eastern side of the Mexican Andes, at an elevation of from 5000 to 8000 feet. The jalap of commerce consists of the irregular, dark brown roots, varying from the size of a hazelnut to that of an egg. The drug has little smell or taste and is one of the most common cathartics, though objected to because of its tendency to give pain. (See illustration on next page.)

Jalapa or **Halapa**, *ha lah'pa*, a city of Mexico, in the Department of Jalapa, 52 mi.

n. w. of Vera Cruz. The climate is fine, and the city is a favorite health resort. The city has a fine cathedral, a Franciscan convent and several schools. The jalap root is found abundantly in Jalapa. Population, 18,173.

Jamai'ca, one of the Great Antilles, the largest of the British West India Islands, 90 mi. s. of Cuba and 100 mi. w. of Haiti. It is 140 miles long and 50 miles wide and has an area of 4200 square miles. In the western coast are the lowlands, and the central part is mountainous, some of the peaks reaching 7000 feet. The Blue Mountains, in the eastern end, are the most important chain and have the loftiest heights. The coast line is indented by a great number of excellent harbors, Port Royal, or the harbor of Kingston, and the Old Harbor being the most important. There are many rivers in Jamaica, most of them unnavigable but employed in the irrigation of the land. Among the most important of these are the Plantain, the Garden, the Black, the Salt and the Cabarita. The vegetable and animal life correspond in general to the vegetable and animal life of the West Indies (See WEST INDIES). The chief industry is agriculture. Indigo, cotton



JALAP

The government of Jamaica is administered by a governor. He is aided by a privy council, appointed by the Crown, and a legislative council, consisting of fifteen members nominated by the governor and fifteen elected by limited suffrage. The island is divided into three counties and is subdivided into fifteen parishes. Jamaica was discovered by Columbus in 1494, and in 1509 the Spaniards settled there. The native population rapidly decreased during the Spanish régime, and by the middle of the seventeenth century it was almost extinct. In 1655 the island was captured by a British expedition, and in 1670, by the Treaty of Madrid, Great Britain gained possession of the island. In the eighteenth century many negroes were brought to the island for sugar-plantation labor. These negroes rose in revolts and were a great drawback to the prosperity of the settlements. They were not completely subdued until 1796. In 1831 another negro insurrection occurred, and two years later an emancipation act was passed, providing for the total extinction of slavery after 1838. The chief towns are Kingston (See KINGSTON), Port Royal, Morant and the important villages of Lucea, Montego Bay, Falmouth and Port Antonio. Population in 1905, estimated at 806,690.

Jamaica, N. Y., the county-seat of Queens co., 12 mi. e. of Brooklyn, on Long Island. It was included in the Borough of Queens of Greater New York in 1898.

James I, of England, also JAMES VI of Scotland (1566-1625), was the only son of Mary Stuart by her second husband, Lord Darnley. In 1567, on his mother's abdication, he was crowned at Stirling. He had much trouble with his nobles, a party of whom made him captive at Ruthven Castle in 1582; but a counter party soon set him at liberty. In 1589 he married Princess Anne of Denmark. In 1603 he succeeded to the crown of England, on the death of Elizabeth, and was received with great enthusiasm. One of the early events of his reign was the Gunpowder Plot, the outgrowth of the constant persecutions of the Catholics which James permitted. An unsuccessful attempt was made to unite Scotland and England, and by a decree all Scotchmen born after the accession of James to the English throne were declared English subjects. In 1613, Elizabeth, the daughter of James, was married to the elector palatine, and at the outbreak of the Thirty Years' War it was expected that James would send aid to his son-in-law, who had been made king of Bohemia.



and cacao were formerly important products, but now these are supplanted by sugar, coffee, bananas, spices and oranges. Tobacco, yams, arrowroot and ginger are also extensively grown, and rum is made. The forests produce many fine trees, including the ebony, logwood, mahogany and lancewood. The chief exports are fruit, sugar, rum, coffee and pimento, and the imports include textiles, fish and flour.

This James seemed unwilling to do, and the little assistance which popular feeling at length compelled him to render, was too late to do any good. He wished to marry his son Charles to a Spanish princess, but this project failed, and war was declared against Spain. The king, however, died soon after. In his reign the authorized translation of the Bible was executed.

James II (1633-1701), king of England, second son of Charles I and of Henrietta Maria of France. In spite of attempts which had been made to exclude him from the throne, because he had adopted the Catholic religion, he succeeded his brother Charles II as king in 1685 and at once set himself to attain absolute power. A rebellion headed by the duke of Monmouth was easily put down, but the result was to confirm the king in his arbitrary measures. He even accepted a pension from Louis XIV, that he might more readily effect his purposes, especially that of restoring the Roman Catholic religion. The result of this course of action was the revolution of 1688, and the arrival of William, prince of Orange. Soon James found himself completely deserted; he quitted the country and repaired to France, where he was received with great kindness and hospitality by Louis XIV. Assisted by Louis, he attempted in 1689 the recovery of Ireland; but the Battle of the Boyne, fought in 1690, compelled him to return to France. All succeeding projects for his restoration proved equally ineffectual, and he spent the last years of his life in retirement.

James, EDMUND JANES (1855-), an American educator and political economist, born at Jacksonville, Ill. He was educated at Northwestern University, at Harvard and in Germany. In 1883 he became professor of public finance and administration in the University of Pennsylvania. While occupying this position he was chosen by the American Bankers' Association to make a study of European business methods, and his report is considered a standard authority. In 1896 he became director of the extension division of the University of Chicago. Six years later he was chosen president of Northwestern University, and in 1904 he became president of the University of Illinois. He is the author of *The Canal and the Railway*, *The Federal Constitution of Germany*, *Education of Business Men in Europe*, *The Growth of Great Cities in Area and Population* and numerous other works of an economic or sociological nature.

James, HENRY (1843-), an American novelist and essayist. He has lived much on the European continent and in England. His novels, which are numerous, depend for their interest on the portrayal of character, rather than on incident, and the later of them, especially, are characterized by the most subtle psychological analysis. Among his works are *Daisy Miller*, *A Passionate Pilgrim*, *Roderick Hudson*, *The Portrait of a Lady*, *The Bostonians*, *The Princess Casamassima*, *The Sacred Fount*, *The Awkward Age*, *The Soft Side* and *The Better Sort*.

James, JESSE W. (1847-1882), an American outlaw and bandit, born in Clay County, Mo., the son of a Baptist preacher. During the Civil War the family was persecuted on account of its sympathy for the Southern cause, and the several sons joined a band of guerrillas, which kept up a lawless warfare until the end of the struggle. Jesse James surrendered at the close of the war, but in 1866 he was declared an outlaw and for the remainder of his life was constantly pursued by officers of the law. During this period he attained wide notoriety by his many bold crimes and his great ingenuity in eluding capture. He was particularly famous for his train robberies in western states. The governor of Missouri finally offered a reward of \$10,000 for his capture, dead or alive, and two members of his own party killed him in his own home. His brother Frank was also a notorious criminal and was implicated in many of his brother's escapades.

James, SAINT, called *the Greater*, the son of Zebedee and the brother of John the evangelist. Christ gave the brothers the name of Boanerges, or *sons of thunder*. According to the Gospels, they witnessed the transfiguration, the restoration to life of Jairus's daughter, the agony in the garden of Gethsemane and the ascension. Saint James was the first of the apostles who suffered martyrdom, being slain by Herod Agrippa about 42 A. D. There is a tradition that he went to Spain, of which country he is the tutelary saint.

James, SAINT, called *the Less*, the brother or cousin of our Lord, who appeared to James in particular after his resurrection. He is called in Scripture *the Just*, and is probably the apostle described as the son of Alphaeus. He was first bishop of Jerusalem, and in the first apostolic council he spoke against those wishing to make the law of Moses binding upon Christians. The progress of Christianity under him alarmed the

Jews, and he was put to death by Ananias, the high priest, about 62 A. D. He is the supposed author of the epistle which bears his name, a book written in very pure Greek and having a high rhetorical character.

James, WILLIAM (1842–), an American psychologist, born in New York and educated at Harvard and in German universities. In 1872 he became professor of anatomy at Harvard, then of philosophy and finally of psychology. Professor James gained a wide reputation by his writings and lectures and is one of the chief American exponents of the new psychology, or psychology from a physiological standpoint. Among his works may be mentioned his *Principles of Psychology*, *Talks with Teachers on Psychology* and *The Will to Believe*.

James Bay, the southern extension of Hudson Bay. It was named from Captain James, who explored it while trying to find the north-west passage. It has numerous rocks and islands, and its navigation is dangerous. The chief affluents are the Albany and East Main rivers.

Ja'meson, LEANDER STARR (1853–), a Scotch physician and soldier. He received his medical education at London University, and in 1878 he went to South Africa, where he acquired a lucrative medical practice. In 1888 he became associated with Cecil Rhodes and in 1891 was made administrator of Rhodesia. In 1895 he was the leader of the famous "Jameson's Raid," a result of the Uitlander agitation in Johannesburg. His advance was checked, and his band surrendered. He was taken to England, tried, convicted of misdemeanor and sentenced to ten months' imprisonment. See SOUTH AFRICAN WAR; TRANSVAAL COLONY.

James River. See DAKOTA RIVER.

James River, a river in Virginia, formed by the union of the Jackson and Cowpasture rivers, which rise in the Alleghany Mountains. It flows east-southeast, passing the towns of Lynchburg and Richmond, and communicates by means of a broad estuary, through Hampton Roads and the mouth of the Chesapeake Bay, with the Atlantic. Its length is 450 miles, and it is navigable from the ocean to Richmond. The principal tributaries are the Appomattox and the Chickahominy. The first English settlement in America was formed at Jamestown, 32 miles from the mouth of this river, in 1607.

James'town, the first permanent English settlement in America, founded by an expedition sent out under the auspices of the London Company and under the immediate command of

Christopher Newport and John Smith. The site chosen was about fifty miles from the mouth of the James River, on a low peninsula, and the landing took place May 13, 1607. For later history of this colony, see VIRGINIA, subhead *History*.

Jamestown, N. D., the county-seat of Stutsman Co., 80 mi. w. of Fargo, on the James River and on the Northern Pacific railroad. The city is in the famous artesian belt and is surrounded by a farming and stock-raising region. It is an attractive place, is beautifully built and has large business interests, including grain elevators, flour mills, stockyards and other industrial establishments. Population in 1905, 5093.

Jamestown, N. Y., a city in Chautauqua co., 69 mi. s. of Buffalo, at the outlet of Lake Chautauqua and on the Erie and the Jamestown, Chautauqua & Lake Erie railroads. It is in a rich agricultural region and has become a popular summer resort. A popular attraction is Celeron, which is an amusement resort on the lake shore, similar to Coney Island. The extensive manufactures include furniture, metallic goods, voting machines and other articles, while in the production of worsted goods it is one of the leading cities in the state. Jamestown has a good high school and the Prendergast Free Library. The place was settled in 1810 and was incorporated as a city in 1896. Population in 1905, 26,160.

Janaushek, yah'now shek, FANNY (FRANZISKA) (1830–), a Bohemian-American actress, born at Prague. She made her début in her native city and appeared successfully in all parts of Europe, for twelve years being leading actress at Frankfort. She came to America in 1867, on this trip playing only in the German language, but returned six years later and successfully undertook English rôles, including Lady Macbeth. She later made several tours of Europe and Australia and finally settled in America, where she continued to act in somewhat lighter parts.

Janesville, jaynz'vill, Wis., the county-seat of Rock co., 71 mi. s. w. of Milwaukee, on the Rock River and on the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. The city is in an agricultural region noted for its fine tobacco, and it has a large trade in farm and dairy produce. There are also stockyards and large lumber and brick yards. The manufactures include cotton and woolen goods, agricultural implements, furniture and other articles. It is the seat of the state school for the blind.

The place was settled in 1837 and was incorporated in 1853. Population in 1905, 13,770.

Jane'way, EDWARD GAMALIEL (1841-), an American physician born near New Brunswick, N. J. He graduated at Rutgers College and from the College of Physicians and Surgeons of New York City. He soon settled at New York, where he labored with eminent success in his practice and as professor in various schools. Since 1898 he has been dean of the University-Bellevue Medical College. He has achieved special fame by his successful treatment of diseases of the chest and abdominal organs.

Jan'izaries, an Ottoman infantry force, somewhat analogous to the Roman praetorians, part of them forming the guard of the sultan. They were originally organized about 1330, and subsequently they obtained special privileges, which in time became dangerously great. They became so influential and their insurrections so frequent that several unsuccessful attempts were made to reform or disband them. At last, in June, 1826, they rebelled on account of a proposal to form a new militia, when the sultan, Mahmud II, having displayed the flag of the Prophet and being supported by their aga, or commander in chief, defeated the rebels and burned their barracks; 8000 of them perished in the flames. The corps was abolished, and a curse was laid upon the name. As many as 15,000 were executed, and fully 20,000 were banished.

Jan'uary, the first month of the year, consisting of 31 days. It was by the Romans held sacred to Janus, from whom the name was derived. The Roman year originally began with March and consisted of only ten months. Numa is said to have added January and February.

Ja'nus, an ancient Latin divinity, the porter of the gods, after whom the first month of the year was named. He was held in great reverence by the Romans, and as the guardian of doors and gates, he was usually represented with two faces, one looking forward, the other backward. In time of war the gates of the chief temple of Janus at Rome were always left open, and in peace they were closed. The principal festival of Janus was New Year's Day, when people gave one another presents.

Japan', an island empire, situated east of Asia, from which it is separated by the Sea of Japan and Korea Strait, and bounded on the e. by the Pacific Ocean. Japan proper, or Old Japan, consists of four large islands, Yezo, Hondo, Shikoku and Kiushiu, together with a large number of smaller islands. The present empire contains, in

addition to these, Formosa, the Loo-Choo Islands to the south, the Kurile Islands to the north and the southern half of Sakhalin, acquired from Russia by the war in 1905. Including these additions the Empire extends from latitude 21° 48' to 51° 56' north, and from longitude 119° 20' to 156° 32' east. The greatest extent from north to south is nearly 2400 mi. The greatest width of any of the islands is about 250 mi., and the average width much less than this. The area of the Empire is about 190,000 sq. mi., or about the same as the combined areas of Colorado and Idaho. The area and population of the principal islands are as follows:

ISLAND	AREA IN SQUARE MILES.	POPULATION.
Hondo.....	87,485	35,460,507
Shikoku.....	7,030	3,167,707
Kiushiu....	16,840	7,260,910
Yezo.....	36,299	843,717
Formosa.....	13,418	2,899,586
TOTAL.....		49,632,427

SURFACE AND DRAINAGE. The first four islands named above form approximately a crescent and are separated from each other only by narrow straits. Their surface is mountainous, and the trend of the main range of mountains is in the same direction as the greatest extent of the islands. Hondo, about 700 miles in length, is characterized by a continuous mountain range, extending from the southwest to the northeast. In this, as well as in the other islands, this range is crossed at intervals by short ranges, extending north and south, and where these ranges meet the mountains are the most numerous and reach their highest altitudes. The islands are of volcanic origin, and among the mountains are many extinct volcanoes, as well as some that are still active. Fujiyama, 60 miles southwest of Tokyo, with an altitude of 12,390 feet, is the highest peak in these islands; it is famous for the symmetry of its cone and the distance from which it can be seen at sea. In Formosa, Mount Morrison rises to the height of 13,595 feet. The mountain ranges and many peaks are separated by deep valleys with steep slopes, through many of which flow rapid streams. The level land is along the lower courses of the streams and near the coast. This and most of the mountains are covered with forests and tall grass, except where the land is suitable for tillage.

In general, the rivers are short and rapid and are navigable for only a short distance. The longest stream is the Ishikari, in Yezo, which

has a length of 407 miles. The Shinano Gawa in Hondo is the second stream in importance, with a length of 320 miles. The others seldom exceed 100 miles, and some fall far short of this. While not useful for commercial purposes, most of these streams are of value as furnishing means for irrigation. There are but few lakes in the Empire. The most important of these is Lake Biwa, in the south central part of Hondo.

CLIMATE. On account of its great extent north and south, the climate of Japan varies from sub-tropical, in the vicinity of Formosa, to sub-arctic, in Sakhalin and the Kurile Islands. The central part of the Empire has an equable and moderate temperate climate, due very largely to the influence of the warm current in the Pacific Ocean (See KURO SIVO). In the northern islands the winters are severe and the snowfall is heavy. In Hondo, Shikoku and Kiushiu, more or less snow falls throughout the winter, but in the southern half of Hondo it remains only a short time. The rainfall depends largely upon the winds; hence the necessity for irrigation during certain seasons of the year, when otherwise the annual precipitation would be enough for agriculture. The climate is healthful, although the summers are hot.

MINERAL RESOURCES. The mineral resources of the Empire include coal, which is found in paying quantities in Yezo and Kiushiu and in smaller quantities in various places. The mines in Kiushiu are quite extensively worked, and the output is now about 7,000,000 tons a year. Iron ore is also found in paying quantities, as is copper. Lead, gold, silver and some other minerals are found in various parts of the Empire, but none of these has been worked to a great extent. Petroleum is obtained in small quantities, and marble, granite and other building stones are generally distributed throughout the islands.

FISHERIES. The streams as well as the coast waters abound in fish, and the taking and curing of these gives employment to a large number of people. Many varieties of fish are caught, the most important including mackerel, sturgeon, haddock, halibut and salmon, in the north, and perch, pike and trout, in the streams. Fish culture is given careful attention by the government, and numerous hatcheries are maintained.

AGRICULTURE. Only a little over one-tenth of the country is suitable for tillage, and farming is on the intensive plan. Naturally much of the soil is unfertile, but by means of fertilization known to the Japanese, careful irrigation and thorough tillage this is made to produce abun-

dant crops. Rice is the most important food crop and is grown wherever the land can be sufficiently irrigated. Following this in the order of importance among the cereals are barley, rye, wheat, corn, buckwheat and millet. Potatoes and all sorts of vegetables are also grown. Tea is raised in the central part of the Empire, and fruits common to the temperate regions are grown to some extent, though they do not seem to thrive as well as upon the continent of Asia. The mandarin orange (See ORANGE) and persimmon are exceptions to this rule. Cherry and plum trees are cultivated for their blossoms. Considerable sugar cane is raised in the southern portion of the Empire. The growing of live stock has not received very much attention, and until a comparatively recent date butter, cheese and milk were unknown to the people, but now they are found in the central and northern portions of the island. Silk is produced in those regions adapted to the growing of the mulberry tree.

MANUFACTURES. The manufacturing industries of Japan may be classed as original and introduced. The original are those which have existed from ancient times. The chief of these industries are pottery making, weaving, embroidering, lacquer work, paper industry, metallic industry, leather work, wood and bamboo work, carving, camphor producing, vegetable wax making, salt making, sugar making, saki brewing, soy brewing, oil producing and tobacco manufactures. It is probable that these industries were introduced from China and Korea, but the original trace has been obliterated. The scope of the work is generally small and is done with rude and simple instruments, especially in the fine arts. The artisans use their residences for workshops and employ only a small number of apprentices. The process of manufacturing is very tedious, but the taste and magnificence of purely Japanese arts are admired throughout the world.

The principal introduced industries, that is, those brought from America and Europe, include spinning, glass work, brick making, preparation of drugs and chemicals, cement works, ship-building, machinery, match, paper and soap manufacture. These industries are generally carried on in a large factory employing many workmen and utilizing water and steam power, thus forming a decided contrast to the native industries. The latest returns show the number of factories and workshops belonging to companies and individual persons to be many thousands, with millions of capital. The silk

producing factories are of first importance; cloth weaving, mining and refining of minerals are next. Other important works are for the manufacture of tobacco, porcelain, earthenware, matches and bricks. There are numerous government workshops under control of various departments, such as the imperial mint, the printing bureau, the Tokyo arsenal, the Osaka arsenal, the woolen-cloth factory; in connection with the war department, several dock yards, naval arsenals and gunpowder factories, all of which are engaged in the manufacture of goods required by the government.

TRANSPORTATION. The first line of railway in Japan was constructed from Tokyo to Yokohama in 1872, and from that time to the present both the government and private corporations have been engaged in extending railway lines, so that now all of the principal cities on the large islands have railway connection with each other. The Empire contains about 5000 miles of railways, nearly 2000 miles of which belong to the government. The extensive coast line and numerous good harbors give Japan unusual facilities for communication by sea, and she maintains a large merchant marine, consisting of over 1300 steamships and about 4000 sailing vessels. Japanese lines of steamers ply regularly between the leading ports of the Empire and the Pacific ports of the United States, also between Japan and India and Europe. In addition to these, the lines of other commercial nations make regular trips to the leading Japanese ports. Through the American and British Pacific cables there is also telegraph communication with the entire civilized world; telephone and telegraph lines are in common use throughout the Empire. An excellent postal system, patterned after that of the United States, is maintained. Roads such as are known in the United States and Europe are few. The most common vehicle for the transportation of passengers is the jinrikisha (See JINRIKISHA). It is believed that this vehicle is patterned after an American sulky, which it quite closely resembles. All in all, the facilities of Japan for transportation and communication compare favorably with those in the United States and the leading European countries.

COMMERCE. The commerce is extensive and is increasing. The construction of railways has widely extended the trade within the islands, since it enables the manufactures to be distributed. The foreign trade amounts to about \$405,000,000 annually. Of this amount over

half is in imports. The leading countries with which this trade is carried on are Great Britain, India, the United States and China. In order of importance the exports are raw silk, cotton yarn, floss silk, manufactures, coal, copper, rice and tea. The leading imports are raw cotton and seed, sugar, iron and steel and other manufactures, including arms and machinery, cotton goods, woolen goods and petroleum.

INHABITANTS AND LANGUAGE. With the exception of the wilds of Yezo, peopled by 12,000 Ainos, the Japanese islands are inhabited by a single race, speaking various dialects of the same tongue. Probably the Japanese are a mixed race, the issue of the intermarriage of victorious Tartar settlers, who entered Japan from the Korean peninsula, with Malays in the south and people of the Aino race in the main island. Japanese annals contain tales of constant war with savages, and in comparatively recent times the Aino race occupied the northern extremity of Hondo. There are two distinct types of Japanese face; that which is found in art designs being the aristocratic and rarer type. It is distinguished by an oval head and face, rounded frontal bones, a high forehead, a nose curved and well shaped but not prominent, narrow and slightly oblique eyes, with an overlapping of the eyelid. In the man the face is almost hairless, with the exception of a narrow and short mustache. The complexion is pallid or slightly olive, and the expression is demure. The commoner type, almost universal in the northern districts, is full-eyed, flat-nosed and good-humored in expression. The stature of the race is small, and the trunk is proportionately long as compared with the legs, which are short. Intellectually, the Japanese are quick and alert. They are invariably of a pleasant temperament and readily adapt themselves to new conditions. This characteristic has been of the greatest importance to the nation in enabling it to introduce and profit by Western civilization, and it accounts very largely for the rapid development which the Japanese have made. See *RACES OF MEN*, color plate, *Mongolian Types*, Figs. 5, 9 and 12.

The Japanese language, like the people, is the result of the combination of a number of languages, including the Tartar, Mongolian, Manchurian and Tungusic tongues. It differs from the Chinese in being polysyllabic. The alphabet contains 47 characters; the verb usually follows the noun, and the language is inflected. It is written in two forms, known as the *Katakana*, or half-letter signs, and the *Hira-kana*, or



THE TEMPLE OF KAMEIDO, TOKYO, JAPAN

full-letter signs. The former is much the simpler and is sometimes known as man writing. The Japanese language is somewhat difficult to learn, because its mastery necessitates the learning of a large number of different forms, known as ideographs. Students of the language believe that should it be written in the English alphabet, its mastery would be very much easier.

GOVERNMENT AND RELIGION. The present government is a constitutional monarchy based upon the constitution adopted in 1889, and in its form and functions it closely resembles the government of Germany, after which it was patterned.

The emperor remains the source of all laws, in so far that without the imperial approval no parliamentary measures can become law, but the making of laws is the function of the Diet, and no law can be put in force without its assent. The emperor determines the organization of every branch of the administration, appoints and dismisses all civil and military officers and has the supreme command of the army and navy. The rights of the people are safely guarded.

The Japanese parliament consists of a House of Peers and a House of Representatives, together called the Imperial Diet, which hold an ordinary annual session of three months—which, however, may be extended by imperial orders—and extraordinary sessions in urgent cases. For the upper house there are four classes of members: (1) members of the imperial family, holding office for life; (2) counts, viscounts and barons, not less than twenty-five years of age, elected by their fellows for seven years; (3) members nominated for life by the sovereign for meritorious service or for erudition, and above the age of thirty; (4) commoners elected in the prefectures and urban districts, one for each district, by the fifteen largest taxpayers. The lower house consists of 300 members, elected by ballot in 258 electoral districts. The suffrage is limited to males not less than twenty-five years old, who must have resided in the district at least a year before registration and must be paying direct national taxes to the amount of not less than fifteen dollars per annum, as well as an income tax. Candidates for election must be at least thirty years old. The duration of each parliament is four years, unless previously dissolved. Members of the government may sit and speak in either House, but can only vote in that of which they are members. For the purpose of local administration the country, with the exception of Yezo and Formosa, is divided into 46

districts, each having a governor and a local assembly elected by the people. These districts are again subdivided into villages, towns, municipalities and counties, each having its chief magistrate, council and assembly.

The religions of Japan are Shintoism, Buddhism and Christianity. Entire religious freedom is granted, and Christianity is making rapid progress. By far the largest proportion of the inhabitants are devotees of Shintoism, a religion based upon the worship of the goddess from whom the emperor is supposed to have descended. It is a mild form of spirit and ancestral worship and is the original religion of the country. Buddhism was introduced from China and engrafted upon Shintoism. Later this was modified by the introduction of Confucianism. While the government has not forbidden the extension of Buddhism, in 1868 it ordered the destruction of all Buddhist symbols and images in temples which had formerly been consecrated to Shintu. See SHINTOISM; BUDDHISM.

ARMY AND NAVY. See ARMY, subhead *Japanese Army*; NAVY, subhead *Japan*.

EDUCATION. Education is general and compulsory. Women are educated with nearly as great care as men. There is a complete system of local elementary, middle and normal schools, and a central university in the capital, with five higher middle schools as feeders, one in Tokyo, the others at Sendai, Kyoto, Kanazawa in Kaga, and Kumamoto. There is also a higher normal school in the capital. The elementary school course extends over eight years (six to fourteen), four years being devoted to an ordinary and four to a higher course. There are also two universities, one at the capital and one at Kyoto. The former consists of six colleges, law, medicine, engineering, literature, science and agriculture. It is attended by about 3000 students. It includes upon its staff German, British, American and French professors and is very well supplied with the best of modern equipment. Other institutions in the capital are the Music Academy, the Technological School, the Dendrological School, the Nobles' School, attended by the young crown-prince, the Peeresses' School, the Girls' Higher School, the Ladies' Institute, the English Law School, the Higher Commercial School, besides eight other commercial schools in the country. Education is perfectly free from class restrictions, even the Nobles' School being by no means exclusively aristocratic. Mission schools have been doing excellent work. The capital is full of private schools and colleges.

The printing press is very active. Daily newspapers abound and are sold astonishingly cheap.

LITERATURE AND ART. The oldest literature dates from the fifth and sixth centuries and is devoted almost entirely to the promulgation of religious doctrines. This continued until about the ninth century, when the introduction of Buddhism caused the development of another literature, based almost entirely upon the Chinese and containing many Chinese words. This was considered for centuries the classic literature of Japan and was learned and taught, but in the seventeenth and eighteenth centuries there was a revival of Shintoism in its pure form. The followers of this school attempted to establish a literature in pure Japanese, but they were not very successful. Later, as the nation came in contact with Western civilization and imbibed Western ideas, Japanese literature took on a new form, with many modern tendencies. This literature was at first repudiated by the educated class, but it has continued to gain in extent and influence, and at the present time Japanese literature embraces a wide range of subjects, including history, science, geography, religion, philosophy, drama, romances and poems. There are also numerous reference works compiled in the language, such as dictionaries and encyclopedias. The Japanese are especially fond of drama, and this class of literature has received considerable attention, most of their dramas being founded on national events. Critics of Japanese fiction assert that it contains many creditable works.

Japanese art has a wide range, as shown in their lacquer and pottery ware, carving in ivory and wood, the extensive ornamentation of their temples and other buildings, all of which are constructed of wood. Painting is universal. In its principles, style and technique Japanese painting resembles quite closely that of China, but in the selection of subjects it is original. Many art critics consider that it takes very high rank because of the excellence of its decorative applications, but it falls far below the standard of painting in modern Europe in completeness. In applications, Japanese art does not vary in important respects from that of European nations. Wall paintings are represented by pictures drawn upon sliding panels, which occupy the place of doors and walls in European and American dwellings. Often portions of the solid wall are ornamented in a similar manner. Painted screens also constitute an important feature of the decorative furniture of rooms. Another mode of decorating is that of fans.

Books and rolls made up of drawings, with or without manuscripts, and loose sketches are made in unlimited numbers. Designs for engravers, for workers in embroidery and lacquer, for pottery and for sculptors are first made by painters. Much of the painting is executed on silk and paper especially prepared for the purpose. The colors were formerly prepared from native or Chinese material, but since the establishment of intercourse with European traders, most of them have been imported.

CITIES. The important cities are Tokyo, the capital; Yokohama, Nagasaki, Kobe, Hiroshima and Hakodadi, each of which is described under its title.

HISTORY. The reputed founder of the present dynasty in Japan was Jimmu Tenno, who ascended the throne in 660 B. C., but all Japanese history before 500 A. D. is to be classed as legendary. In 552 A. D. Buddhism was introduced from Korea and became, forty years later, the established religion. In the sixth century, direct relations were entered upon with China, and Chinese culture was rapidly assimilated. During the five centuries which ensued, the people made immense strides in civilization. A complete system of officialdom was organized under the rule of the Fujiwara family, whose members filled all the chief posts under the government.

The loss of power of this family and the growing weakness of the government favored the rise of the hitherto subordinate military class, which in the person of Yoritomo, who was created *shogun*, or general, in 1192, seized the reins of power. The usurpation of supreme authority by this officer led to the erroneous belief in Europe that down to 1868 there were two emperors in Japan, a *mikado*, or spiritual emperor, who did not govern, and a *shogun*, who really governed, though he paid formal homage to the mikado.

From the thirteenth to the beginning of the seventeenth century Japan was torn by civil strife. The military fiefs organized by Yoritomo raised up a feudal baronage, who succeeded in making themselves virtually independent of imperial power. At one time (1336-1392) two dynasties held sway, one in the North and one in the South. The shogunate itself lost its importance, but the military genius of Hidéyoshi prepared the way for its revival by Iyáyasu, the illustrious general and statesman, who gave a lasting peace to Japan. Iyáyasu in 1600 fixed his seat of government at Yedo, and, backed principally by the northern clans, was able to consolidate

Japan

his power and to found a permanent succession, his dependents ruling at Yedo until 1868. From a collection of small, scattered villages this place soon grew to one of the most populous cities in the world.

The Portuguese, who first landed in Japan shortly before the middle of the sixteenth century, carried on a lucrative trade, but the ruling powers took alarm, ordered away all foreigners and forbade the introduction of the Christian religion (1624). The Portuguese continued to visit Japan until 1638, when they and their religion were finally expelled. From this time the Japanese government maintained the most rigid policy of isolation. No foreign vessels might touch at Japanese ports under any pretense, and Japanese sailors wrecked on any foreign shore were with difficulty permitted to return home. In 1853 Commodore Perry entered a Japanese harbor with a squadron of United States war vessels. He extorted a treaty of commerce from the shogun in 1854, and other countries followed the example of the United States until sixteen in all had obtained the same privileges.

The discontent which had for long been felt with the shogun gradually became general, and in 1867 he was compelled to resign. Yedo was recognized as the capital of the remodeled government, but its name was changed to Tokyo. Educators from the United States were invited to found a new educational system in Japan; British seamen reorganized the navy; French officers remodeled the army. Western laws were introduced, a new nobility was created on a Western basis and in 1889 a constitution was proclaimed. During the last quarter of a century the Japanese court has emerged from the seclusion in which it had maintained itself so long, and the emperor and empress are now present at public spectacles, while the present crown prince was educated at a public school.

In 1894, through trouble in Korea, Japan became involved in a war with China. The Japanese had a decided advantage in equipment and numbers, and the war had not been long in progress before it became clear that defeat for China was certain. The Chinese navy was almost completely destroyed, and in February, 1895, China was compelled to ask for peace. Japan took an active part in the rescue of the foreign legations in Peking during the Boxer uprising (See CHINA, subhead *History*). For the war with Russia see RUSSO-JAPANESE WAR. Consult Bishop's *Unbeaten Tracks in Japan*;

Jasmine

Browne's *Japan, the Place and the People*, and Davidson's *Present Day Japan*.

Japan Current. See KURO SIVO.

Japan'ning, the act of applying varnish to such articles as wood, metal, leather, *papier-maché*, in imitation of the lacquered work of Japan and China. The article to be japanned, being made thoroughly dry, is first brushed over with two or three coats of seed-lac varnish, to form the *priming*. The next coat of varnish is mixed with the color desired, and where a design is intended it is now painted with colors. The whole is then covered with additional coats of varnish, which are dried and polished as applied. In japanning iron, the articles are coated with the varnish, then baked in an oven.

Japheth, *ja'feth*, a son of Noah (*Gen. ix, 18*), born when Noah was about 500 years old. His descendants, according to *Genesis x, 5*, peopled the isles of the Gentiles, and thus Japheth is often considered the ancestor of most European nations.

Japura, *zhah poo'rah*, or **Yapura** (sometimes called Caqueta in its upper course), a large river of South America, an affluent of the Amazon, with its source in the Andes of Colombia. It flows in a general east-southeast direction and forms for some distance the (disputed) boundary between Ecuador and Colombia. It passes through forests of Ecuador and Brazil for many miles and falls into the Amazon. Its length is more than 1300 miles, and it is navigable to Cupaty Falls, a distance of 620 miles. Above the falls it is again navigable for several hundred miles.

Jasmine, *jas'min*, or **Jessamine**, the name of a genus of plants mostly natives of warm parts



JASMINE

of Asia. The common jasmine is a native of South Asia. In northern lands it is cultivated

as a garden shrub. It grows from six to ten feet high, has fragrant blossoms and resembles the evergreens. The flowers are used in making oil of jasmine, a delicate perfume. *Cape jasmine* is the name commonly applied to the gardenia, a subtropical plant belonging to the madder family. The flowers are large, white and fragrant, and the leaves are very beautiful. This species is a popular hothouse plant in England and the United States, except in the South, where it is a favorite garden shrub. The *Carolina jasmine* is a beautiful climbing vine which is common in South Carolina and other Southern states. The flowers are a deep, bright yellow, with a fragrance similar to that of the true jasmine. Still another species is the *Spanish jasmine*, which has very fragrant flowers from which oil is made.

Ja'son, in Greek legend, king of Iolcos in Thessaly, the leader of the Argonautic expedition. On his return from this quest he brought with him, as his wife, Medea, and she helped him to renew the youth of his father and to put to death his uncle Pelias, who had usurped the throne. After the death of Pelias, however, Jason was unable to keep possession of his throne and fled to Corinth, where some time later he deserted Medea and married Glauce, daughter of the king of that country. See ARGONAUTS; MEDEA.

Jas'per, an impure, opaque, colored quartz, less hard than flint or even than common quartz, but giving a spark when struck with steel. It is entirely opaque, or sometimes feebly translucent at the edges, and presents almost every variety of color. It is found in metaphoric rocks and often occurs in very large masses. Jasper admits of an elegant polish and is used for vases, seals, snuff boxes and other ornaments. There are several varieties, as red, brown, blackish, bluish, Egyptian. Agate jasper is jasper in layers with chalcedony (See AGATE). *Porcelain jasper* is only baked clay. The massive varieties form excellent building stone.

Jasper, WILLIAM (about 1750-1779), an American soldier, born in South Carolina. He distinguished himself at the siege of Fort Moultrie by leaping over the parapet and rescuing the colors which had been shot away. The commission as lieutenant which was offered him as a reward for this act, he refused to accept on account of his lack of education. In many later engagements he showed great bravery, and it was while trying to fasten the colors to a parapet during the attack on Savannah that he was killed.

Jassy, *yahs'se*, a town of Rumania, in Moldavia, on the Bahluiu, several miles from the Pruth. There are many churches, among which are a cathedral, the Church of Saint Nicholas and the Church of the Three Saints. There are a university, a theological seminary, a school of art and a school of music. The manufactures are few, but the trade is of some importance, and a great deal of business is done at the fairs. Population in 1899, 77,759.

Jats, *jauts*, an Indian race occupying a large part of the Punjab and half of the Rajput states of India. They are a hardy, industrious, agricultural people, rearing large flocks of camels in the desert districts of Sind. Their religion varies with locality and embraces Brahmanism, the Sikh tenets and Mohammedanism. They number about 5,000,000.

Jaundice, *jahn'dis*, or **Icterus**, a condition of the body in which the skin turns to a greenish-yellow color. Jaundice is not itself a disease, but an indication of a disease of the liver, which prevents that organ from separating the coloring matter of the bile from the blood. The yellow color first appears in the whites of the eyes and then in the whiter parts of the skin.

Java, *jah'va*, an island in the Indian Archipelago, the most important of the Dutch East Indies. It is bounded on the n. by the Java Sea, which separates it from Borneo; on the e. by the Strait of Bali, which separates it from the island of Bali; on the w. by the Strait of Sunda, which separates it from Sumatra, and on the s. by the Indian Ocean. It is 660 mi. long and from 46 to 121 mi. wide and has an area of 50,390 sq. mi. The island is very mountainous and has a great number of volcanic peaks, some reaching an altitude of more than 12,000 feet above the level of the sea. Most of the active volcanoes are found in the west of the island and are noted for their great eruptions. In 1686 the peak of Ringhit, one of the loftiest, had an eruption which destroyed 10,000 lives. Among the best known peaks are Semeru, 12,040 feet high; Raun, 10,822 feet; Slamet, 11,247 feet; Gédé, 9718 feet, and Salak, 7000 feet high. One of the best known eruptions was that of Krakatoa in the Strait of Sunda (See KRAKATOA). The south coast of Java is steep and rocky, with cliffs rising to a great height, while the north coast is low and swampy. Among the many rivers are the Solo, the longest, 175 miles; the Surabaya, or Brantes, and the Tji Manuk. There are many plains and valleys which are known for their wonderful fertility.

Java is the richest and most fertile of all islands of its size. The distribution of vegetation is according to elevation. In the lowest zone are found rice, sugar cane, cotton, indigo and palm trees. In the plains and swamps are thickets of bamboo and many flowers. Above this, extending from 2000 to 4500 feet, are found coffee, tea, cinchona, many palms, fruits, teak, mahogany, sandal wood, rubber and many varieties of flowers and vines. Above this, up to 7500 feet, is a cool zone in which are found maize, tobacco, cabbages and potatoes. Extending from 7500 to 12,000 feet are found many varieties of European flowers, such as the daisy, buttercup, honeysuckle and violet. Among the many fruits are oranges, lemons, cocoanuts, bananas, mangoes and durians. Java is rich in forests, and teak is the chief product. The chief industry is agriculture, and rice is the most important crop. The chief imports are coal, fertilizers and petroleum, and the chief exports are sugar, coffee, tobacco, rice, quinine, tea, rubber, gutta-percha, cocoa and spices. Java is famous for its Biutenzorg, one of the finest botanical gardens in the world, surpassing all others in wealth and luxuriance of vegetation.

Java is divided into twenty-three residencies, controlled by a governor-general, who is assisted by a council of five, which serves as a legislative and advisory body. In each province there is also a resident, aided by assistant residents and subordinate officers called controllers. The governor-general resides in Batavia, the capital. The lower administrative offices are filled by natives.

The history of Java is unknown up to the eleventh century, when it became the site of powerful Hindu realms. The Hindus founded a dynasty and converted the natives to Brahmanism. This was overthrown by the invasion of the Mohammedans in 1478. In the early sixteenth century the Portuguese made their way to the island and were succeeded by the Dutch in 1595, who wrested from them the supremacy. At this time the two chief states were Mataram and Bantam. After the Dutch conquest was completed Mataram was divided into the sultanates of Sarakarta and Jokyokarta, which exist at present. Bantam disappeared a century ago. From 1811 to 1815 Batavia was in the hands of the English. Since then the Dutch have held the supremacy. Population in 1900, 28,746,688.

Jay, a common bird of the crow family, trim in shape and active in disposition; in some

species bright colored and bearing a handsome crest. In the United States the saucy blue jay with its bright blue, black and white plumage is well known for its fantastic motions and its great skill in imitating the calls of other birds.



BLUE JAY

The *Canada jay*, or *whisky Jack*, or *lumber Jack*, is a bird of rather somber coloring, but with the bold, noisy and active habits of the other jays. The common European jay is cinnamon-colored, varied with white, black and blue. See NEST, color plate, Fig. 8; BIRDS, color plate.

Jay, JOHN (1745-1829), an American jurist and statesman. He was graduated from King's College and in 1766 was admitted to the bar. In 1774 he was chosen a delegate to the first American Congress, at Philadelphia, and was also a member of the second Congress. In 1778 he was appointed minister plenipotentiary to Spain and became one of the commissioners to negotiate a peace with Great Britain. Returning to the United States, he was appointed secretary of state and afterward chief justice. In 1794 he was sent as envoy extraordinary to Great Britain and concluded a treaty, called after his name, by which \$1,000,000 was given to Americans as compensation for illegal captures by British vessels, and the eastern boundary of Maine was fixed. The treaty was extremely unpopular in the United States, and it was ratified only after a bitter struggle. Jay served six years as governor of New York, then retired to private life. See JAY TREATY. (See illustration on next page.)

Jayhawker

Jay'hawker, the name applied to one of a class of irregular, lawless soldiers or bush-rangers in the Southern and Western states of the



JOHN JAY

Union. The term arose in Kansas during the fight over slavery.

Jay Treaty, the name given to a treaty between Great Britain and the United States, negotiated and signed for the United States by John Jay, in 1794. It provided for the evacuation of the forts in the Northwest by the British, for a commission to determine the northeast boundary between Canada and the United States and for compensation to the United States for illegal captures of American merchantmen after the Revolutionary War. The treaty was exceedingly unpopular in America, since it contained no reference to the impressment of seamen or to the kidnaping of negroes by the British army, and because it placed restrictions on United States trade with the West Indies. Charges of bribery and corruption were leveled at Jay and even at Washington, and the ratification of the treaty was made a party issue, but was finally accomplished after a hard struggle.

Jeannette, *jen net'*, PA., a borough in Westmoreland co., 26 mi. s. e. of Pittsburg, on the Pennsylvania railroad. It is in an agricultural and coal-mining section and is supplied with natural gas. The manufactures include glass and rubber goods, fans, electro-carbons and other articles. Population in 1900, 5856.

Jefferson

Jeannette Expedition. See NORTH POLAR EXPLORATION.

Jefferson, JOSEPH (1829-1905), an American actor, born in Philadelphia. His great-grandfather was a member of Garrick's company at Drury Lane, while his father and grandfather were well-known American actors. Jefferson was on the stage from his very infancy, appearing as a child in *Pizarro* when only three years of age, and dancing as a miniature "Jim Crow" when only four. For many years he went through the hard training of a strolling actor and then played in New York, where in 1857 he made a hit as Doctor Pangloss, in the *Heir-at-Law*, and in 1858 created the part of Asa Trenchard in *Our American Cousin*, Sothern playing Lord Dundreary. Some time later he assumed for the first time the rôle of Caleb Plummer in *The Cricket on the Hearth*.

In 1865 he visited London and at the Adelphi Theater played for the first time his world-famous part of Rip Van Winkle in the play arranged by Boucicault from Irving's story. The character was a perfect work of art—beautiful in conception, subtle and delicate in execution. After a long run with Rip Van Winkle, Jefferson



JOSEPH JEFFERSON

returned to his earlier parts, and in 1868 he made for himself another famous rôle, as Bob Acres in *The Rivals*. From 1880 until his death

Jefferson

Jefferson did not attempt new rôles, but as Rip, Caleb Plummer and Bob Acres, he retained all his early popularity. He had considerable talent as a painter, and many of his pictures, produced for recreation and amusement, have been given high praise by critics. Aside from his remarkable ability as an actor, Jefferson's high character and charming personality won for him a high place in the esteem of the American people.

Jefferson, THOMAS (1743-1826), an American statesman, author of the Declaration of



THOMAS JEFFERSON

Independence, third president of the United States, born in Albemarle County, Va. He was educated in the common schools and under private instructors, later studied at William and Mary College and then studied law, being admitted to the bar in 1767. He was elected to the lower house of the colonial legislature in 1769 and took a prominent part in the advocacy of radical measures of resistance to Great Britain. In March, 1773, Jefferson, with Patrick Henry and other kindred spirits, formed a committee of correspondence, an action which led to a second dissolution of the legislature. He took a prominent part in the agitation in favor of the Continental Congress, and a tract which he had drawn up as instructions to Virginia's delegates was later published as *A Summary View of the Rights of British America*, which had a

Jefferson

wide circulation and powerful influence. In 1775 he was elected to the Continental Congress and there rose to prominence as a writer of documents, though he did not excel as a debater. In the spring of 1776 he was appointed on a committee to draw up a declaration of independence and was the principal author of the document.

He retired from Congress in the fall, devoting himself to political work in his own state, where he had an important influence in incorporating democratic ideals in the new constitution and laws. He served in the legislature and as governor, and at the close of the war he was chosen one of America's commissioners of peace, but did not sail, the work having been practically accomplished before he was ready to leave America. Jefferson reëntered Congress in 1783 and for a year performed important service. In the following summer he was sent to Europe with Franklin and Adams to make commercial treaties, and in 1785 he became sole American representative in France. For five years he remained abroad and, though not negotiating many important treaties, he did much to raise the prestige of the American government and to popularize the American cause.

He returned to America and reluctantly accepted the office of secretary of state in Washington's first administration. Here he first came into conflict with his great rival, Alexander Hamilton, whose sympathies with a strong central government were diametrically opposed to Jefferson's instincts. This opposition became particularly acute during the trouble between France and England in 1793, when Jefferson's followers desired not only recognition for Genet (See GENET, EDMUND CHARLES), but wished the United States to take actively the side of France. He retired from office in the same year, and at the close of Washington's second term he became the candidate of the Anti-Federalists for president; but being defeated by Adams, Jefferson became vice-president. In this position he also came into conflict with his superior officers, and at the passage of the Alien and Sedition Laws he secured the adoption of the famous Kentucky and Virginia Resolutions, of which he was the author (See KENTUCKY AND VIRGINIA RESOLUTIONS).

The campaign of 1800 was extremely bitter, and Jefferson and Burr, the two Republican candidates, received the same number of votes, Jefferson finally being chosen by the House of Representatives. He immediately instituted

changes in the customs of the White House, particularly emphasizing his democratic ideas. The most important event of his first administration was the purchase of Louisiana. The government was also concerned with a small war with the Barbary pirates. Jefferson was reelected in 1804 and was immediately confronted with foreign questions of great importance, chief of which was the attitude of Great Britain toward American merchantmen. Jefferson attempted to apply a policy of non-intercourse and commercial restriction, but he was unsuccessful. He retired from office in 1809 and never again entered public life, but continued to write for the press upon public issues. During his retirement he founded the University of Virginia, which he considered one of the two greatest achievements of his career.

In many respects, Jefferson was in advance of his time in his political and social ideals, but he was not a strong executive and was often indiscreet in his advocacy of his favorite policies. As some one has said, he was a friend of the common people, "who not only served them, as many have done, but who honored and respected them, as few have done." In impressing this democratic ideal upon the American government and society, he performed his most notable service. See Morse's *Thomas Jefferson* in the American Statesmen Series.

Jefferson City, Mo., the capital of the state and the county-seat of Cole co., 125 mi. w. of Saint Louis, on the Missouri Pacific, the Chicago & Alton, the Missouri, Kansas & Texas and other railroads. The city occupies a lofty site near the geographical center of the state. It is the seat of Jefferson City College and of Lincoln Institute, a normal school for negroes. There are Carnegie, state and supreme court libraries, about ten churches and five hotels. Among the other prominent buildings are the state capitol, the penitentiary, the armory, the governor's mansion, the supreme court building and the United States courthouse. The city is an important trade center for a rich agricultural and mining region. There are railroad shops of the Missouri Pacific and extensive manufactories of agricultural implements, shoes, clothing, flour, foundry products, brick and other articles. The place was settled in 1826 and was incorporated in 1839. Population in 1900, 9664.

Jeffersonville, IND., the county-seat of Clark co., on the Ohio River opposite Louisville, Ky., and on the Baltimore & Ohio, the Cleveland, Cincinnati, Chicago & Saint Louis and

other railroads. There are extensive manufactories of boats, railroad cars and various smaller articles. The state reformatory for men and a United States quartermaster's supply depot are here. Population in 1900, 10,774.

Jeffreys, je'f'riz, GEORGE, Lord (1648-1689), an English judge. Soon after beginning his professional career he was chosen recorder of London, and he was appointed, successively, a Welsh judge and chief justice of Chester. In 1680 he was created a baronet and was later appointed chief justice of England. He was one of the advisers and promoters of the arbitrary measures of James II; and for his sanguinary and inhuman proceedings against the adherents of Monmouth on the "bloody western circuit," he was rewarded with the post of lord high chancellor (1685). On the arrival of William III, the chancellor, who was attempting to escape, disguised as a seaman, was detected and committed to the Tower, where he died.

Jehoshaphat, je hosh'a jat, (Jehovah's judgment), son of Asa and fourth king of Judah, about 896-871 B. C. He was noteworthy for his strenuous endeavors to abolish the use of idols.

Jeho'vah (Hebrew, *Yahveh*), the popular pronunciation of the sacred name of God among the Hebrews, represented in the text of the Old Testament by the four consonants J (or Y), H, V, H. The Hebrews cherished the most profound awe for this name, which led them to avoid pronouncing it and to substitute the word *Adonai*, signifying *the lord*. This custom still prevails among the Jews. In some portions of the Pentateuch Jehovah is the name regularly applied to God, in others Elohim, which has led to a theory of two authors respectively for these portions.

Je'hu, the founder of the fourth dynasty of the kingdom of Israel. He was a commander in the army of Jehoram, when Elisha sent one of the "children of the prophets" to consecrate him king of Israel at Ramoth-Gilead, about 842 B. C. He immediately attacked Jehoram, whom he slew in battle, and he then entered upon a work of extermination in which were slain seventy of Ahab's children, Jezebel, Ahaziah, king of Judah, and forty-two brothers of Ahaziah. He died after a reign of twenty-eight years. His name occurs more than once on the monuments discovered at Nineveh.

Jelly, a name for such substances as are liquid when warm, but which coagulate into a gelatinous mass when cold. Fruit jellies are made by pressing out the juice of the fruit and

Jellyfish

boiling it with a certain proportion of sugar. They are highly prized as delicacies. Animal jelly is prepared from the soft parts of animals, and even from bones, when sufficiently crushed. It is a colorless, elastic, transparent substance, without taste or smell, and is soluble in warm water. See GELATIN.

Jellyfish, the popular name of several different animals found in the sea and often called *sea blubbers* or *sea nettles*, from their appearance or from their stinging properties. When in the water they present a singularly beautiful appearance, one of the most common being a clear, crystalline bell, which swims gracefully through the water by alternately expanding and contracting its body. They move rapidly and seize their prey with their long stinging tentacles.

Jemappes, *zhe mahp*, **BATTLE OF**, a battle at the village of Jemappes, in the province of Hainaut, Belgium, fought Nov. 6, 1792, between a French army of 46,000 men under Dumouriez, and an Austrian force of 26,000 under the duke of Saxe-Teschén. It resulted in a brilliant French victory and was notable for several dramatic episodes, among which was the gallant charge led by the future king of France, Louis Philippe, and the rally of French soldiers under the inspiration of the strains of the Marseillaise Hymn.

Jena, *ya'nah*, a town of Germany, in the grand-duchy of Saxe-Weimar-Eisenach, 12 mi. e. of Weimar, on the Saale. It is a place of little importance except for its university, which was opened in 1558. Population in 1900, 20,686. See JENA, BATTLE OF.

Jena, **BATTLE OF**, a battle fought at Jena, October 14, 1806, between the Prussians under Prince Hohenlohe and the French under Napoleon. The French, who considerably outnumbered the Prussians, were completely victorious.

Jenghis Kahn, *jen'giz kahn*. See GENGHIS KAHN.

Jenks, JEREMIAH WHIPPLE (1856-), an American writer and teacher of political economy, born at Saint Clair, Michigan. He was educated at the University of Michigan and later in Germany, where he took his doctor's degree. Upon his return he was admitted to the bar. He later taught successively in Mount Morris College, Knox College, Indiana University and, finally, Cornell University, where he became professor of political economy and politics. He attained a high reputation as a student of modern industrial problems and was the expert agent of the United States Industrial

Jerboa

Commission in the investigation of trusts in the United States and Europe. Later he was connected with the department of labor as special industrial expert and made several trips to Europe and the Orient in the study of special questions. He has published many magazine articles, besides several books, among which *The Trust Problem* is perhaps best known.

Jen'ner, EDWARD (1749-1823), an English physician, celebrated for having introduced the practice of vaccination as a preventive of the smallpox. He studied at London and afterward settled in Gloucestershire as a medical practitioner. About 1776 the belief common among the peasants that casual cowpox acquired in milking cows was a preventive of smallpox caused him to direct his inquiries to the subject and led to the introduction of the process of vaccination in 1796. His method at first met with great opposition from the medical profession, but was ultimately accepted universally, both by his own and foreign nations. See VACCINATION.

Jephthah, *jeft'ah*, one of the Hebrew judges who defeated the Ammonites and, having rashly made a vow that if he was victorious he would sacrifice to God as a burnt-offering whatever should first come to meet him from his house, was met on his return by his daughter, his only child, whom he sacrificed, in consequence, to the Lord.

Jerbo'a, a genus of small rodents having extremely long hind limbs, which give them an



JERBOA

extraordinary power of leaping, so that their movement seems more like flying than running. The fore limbs are armed with short, powerful claws, with which the animal excavates its burrows and extracts the roots on which it chiefly lives. Jerboas live in communities, are nocturnal in their habits and hibernate during the colder seasons, though they do not store food for the winter. The jerboas are found

chiefly in Asia and northern Africa. The typical species is the Egyptian form. The jerboa is closely allied to the American jumping mouse, or deer mouse. See DEER MOUSE.

Jeremi'ah, the second of the great prophets of the Old Testament. He flourished during the darkest period of the kingdom of Judah, under Josiah, Jehoahaz, Jehoiakim, Jeconiah, or Jehoiachin, and Zedekiah. He was called to the prophetic office about 629 B. C., in the reign of Josiah, and he lived to see the capture of Jerusalem by Nebuchadnezzar in 586 B. C. Nebuchadnezzar offered him a home at Babylon, but he preferred to stay among the wretched remnant of the people left in Judah. He is said to have been stoned to death in Egypt by some of his countrymen who were irritated by his rebukes. Jeremiah wrote the books *Jeremiah* and *Lamentations*, and probably some of the *Psalms*.

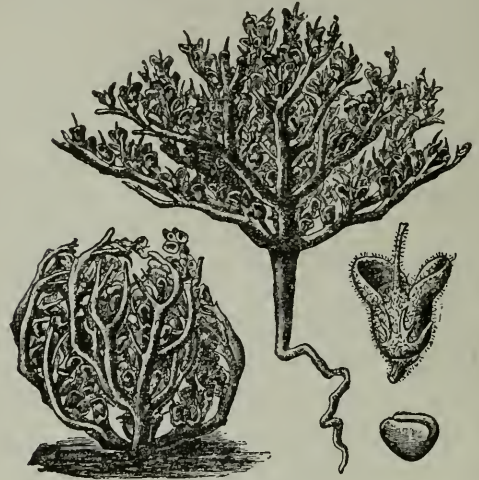
Jeremiah, LAMENTATIONS OF. See LAMENTATIONS.

Jerez de la Frontera, *ha'rath da lah frohn ta'rah*, a city in the Province of Cadiz, Spain, 16 mi. n. e. of Cadiz. It is noted for its wine, well known under the name of sherry, which is exported in large quantities. There are two parts to the city, the older of which is surrounded by the remains of old Moorish walls. Among the noteworthy features are an old Moorish castle, several theaters, a library and numerous educational institutions. Near the city is the La Curtuja convent, famous for its fine architecture. Population in 1900, 60,846.

Jericho, *jer'e ko*, a town of ancient Judea, on a plain about 18 mi. n. e. of Jerusalem, noted, especially in Solomon's time, for its balsam gardens and its thickets of palm trees and roses. It was the key of Palestine and was therefore invested by the Israelites who had passed the Jordan under Joshua to conquer this country. The account of the invasion and capture is told in the book of *Joshua* II, v-vii. Joshua pronounced a curse upon him who should rebuild the city, but it was rebuilt in the days of Ahab. It grew to considerable importance and is often spoken of in later history. Herod favored it and resided there, and Christ performed many miracles at Jericho. Vespasian destroyed the city, but it was again rebuilt. Its site is now occupied by the small village of Er-Riha.

Jericho Rose, a small plant belonging to the mustard family, which came originally from Arabia. As soon as it is mature, the leaves

fall off, and the stems, as they dry, close in toward the center, making a ball of the whole plant, which breaks loose and rolls over the ground. When it reaches water the branches expand and turn green again and the seeds



JERICHO ROSE

fall out. These plants may be often found in the markets, and are rather interesting, as they can be made to brighten up and expand or contract into gray balls as they are kept in water or are dried.

Jerobo'am, the name of two kings of Israel. **JEROBOAM I**, the son of Nebat, on Solomon's death, 973 B. C., was made king of the ten tribes who separated from Judah and Benjamin. He died in the twenty-second year of his reign (*II Kings* XI, XII, XIII). **JEROBOAM II**, the most prosperous of the kings of Israel, reigned 823-782 B. C. He repelled the Syrians, took their cities of Damascus and Hamath and reconquered Ammon and Moab. Licentiousness and idolatry were prevalent during his reign. Amos and Hosea prophesied during this time.

Jerome', **JEROME Klapka** (1859-), an English humorist. He was educated at the Philological School of Marylebone and was successively actor, journalist, tutor, stenographer and clerk. In 1889 he published his *Idle Thoughts of an Idle Fellow*, which gained for him wide popularity. Among his other books may be mentioned *Three Men in a Boat*; *John Ingerfield*, and *Other Stories*; *Stage Land*; *Novel Notes*, and several good comedies.

Jerome, **SAINT**, in full, Eusebius Hieronymus Sophronius, (?-420), one of the most learned fathers of the Latin Church, was born

Jerome

sometime between 331 and 345 in Dalmatia. His parents were both Christians and were wealthy. He was baptized in Rome, went to Antioch, in Syria, in 373 and in the following year retired to the desert of Chalcis, where he passed four years in severe mortifications and laborious studies. He left his solitude to be ordained priest at Antioch, went to Constantinople to enjoy the instruction of Gregory of Nazianzus and in 382 returned to Rome, where his expositions of the Holy Scriptures gained many adherents. His Latin version of the Old Testament from the original language was the foundation of the Vulgate. He took an active part in many controversies, especially in those regarding the doctrines of Origen and Pelagius.

Jerome, WILLIAM TRAVERS (1859-), an American lawyer, born in New York. He was educated at Amherst College and in law at the Columbia Law School, being admitted to the bar in 1884. After serving seven years as a justice of the court of special sessions in New York City, he was elected district attorney of New York County as a Democrat in 1901 and was reelected as an independent candidate after a memorable campaign in 1905.

Jerome of Prague (1360-1416), a Bohemian reformer, in faith and sufferings the companion of the famous John Huss. Together they made a vigorous crusade against the dissoluteness of the clergy, the worship of relics and other faults of the Church. When Huss was imprisoned in Constance, Jerome hastened to his defense, but was seized and carried thither in chains (1415). After much suffering he consented to recant his heresies, but on being given a new examination, he solemnly retracted his recantation and made a vigorous vindication of the principles of Huss and Wyclif. On May 30, 1416, he was burned at the stake, and his ashes were thrown into the Rhine.

Jersey, *jur'zy*, the largest and most valuable of the Channel Islands, about 15 mi. off the northwest coast of France (See CHANNEL ISLANDS). It is 11 miles long and 4 to 6 miles wide and has an area of 45 square miles. The climate is peculiarly mild and agreeable. Wheat is the principal cereal raised, and large quantities of grapes, peaches, melons, pears and other fruits are exported. Cows of the famous Jersey and Alderney breeds are reared and exported in great numbers. The principal town is Saint Helier. Population, 52,796.

Jersey City, N. J., a city and the county-seat of Hudson co., the second largest city of New

Jerusalem

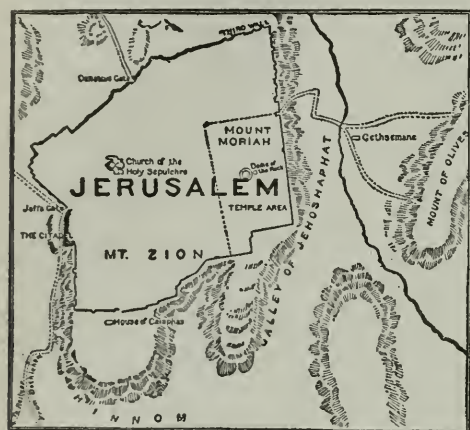
Jersey, situated in the northeast part of the state, on the termini of twelve lines of railway, including the Central of New Jersey, the Erie, the Pennsylvania, the West Shore and other railroads. It is connected with New York City by ferries and tunnels, and several lines of trans-Atlantic steamships dock at this point. Among the prominent buildings are the city hall, the Fourth Regiment Armory, Saint Francis and Christ hospitals, a historical museum and a public library. The educational institutions include Hasbrouck Institute and Saint Peter's College. Jersey City Heights, practically the southern ridge of the Palisades, contains many beautiful residences and fine streets. West Side Park, now being built, will cost \$1,500,000. A boulevard 100 feet wide and 18 miles long traverses Hudson County from north to south and commands an extensive and impressive view. The shipping and railroad facilities of Jersey City are excellent. There are trolley connections with all the large cities of the state, besides local lines throughout the tributary region, and among the industries are locomotive and railroad supply works, steel, foundry and machine shops, grain elevators, sugar refineries and manufactures of crucibles, glass, zinc, chemicals, jewelry, fireworks, lead pencils, chains, rubber goods and copper ware. Foreign and domestic commerce in iron, coal, produce and general merchandise is very extensive. There are large stockyards in the vicinity. The site of Jersey City was formerly called Paulus Hook, but in 1820 it was chartered as the City of Jersey and in 1838 as Jersey City. Population in 1905, 232,699.

Jeru'salem, the chief city of Palestine, one of the most ancient and interesting cities in the world. It stands on an elevated site about 2500 feet above the sea, within the fork of two ravines, the valley of Jehoshaphat on the east, and the valley of Hinnom on the south and west, while the Tyropoean, a third valley, traverses it from south to north. The city stands on four hills, once separated by deep valleys, which are now partially filled up by the debris of successive ruins. Zion, the most celebrated of these summits, on the southwest, rises to a height of 300 feet above the valley of Hinnom. Mount Moriah is on the east, and on the northeast is Mount Bezetha, a little higher than Moriah. Mount Akra is on the northwest. The Mount of Olives is to the east of the city.

Jerusalem is not mentioned by name in

Jerusalem

historic annals until about 1500 B. C., when it was in the hands of the Jebusites. The lower part was taken from them by Joshua, but the upper part continued in their possession till the time of David, who captured the citadel and took up his residence in the stronghold of Zion, making the city the capital of his kingdom and calling it "City of David." It reached the height of its glory under Solomon, who erected the Temple on Mount Moriah. In 586 B. C. Nebuchadnezzar took and destroyed the city after a long siege and carried off as captives to Babylon those of the inhabitants whom the



sword had spared. On their return from captivity the Temple was rebuilt, in 515 B. C., but the walls were not rebuilt until the time of Ezra and Nehemiah, 255 B. C. In 332 B. C. the city passed into the hands of Alexander the Great. It regained a considerable degree of prosperity by 168 B. C., but in that year it was sacked and its walls leveled by Antiochus of Syria. Under the Maccabees, Jerusalem, in common with Judea, once more became independent, in 165 B. C. It next became tributary to Rome. It had been greatly beautified and enriched with a fine new Temple by Herod when Jesus Christ appeared. In 66 A. D., Jerusalem was taken by a party of Jews, who had revolted against Rome. Titus, the son of the emperor Vespasian, regained it in the year 70 A. D., after a siege which was one of the most terrible in history. The Temple was burned, and the city was utterly destroyed. In 131 Hadrian ordered the city to be rebuilt, but it continued depressed till the beginning of the fourth century. Rome having become more Christian, Jerusalem then shared in the benefit and assumed the appearance of a distinguished

Jerusalem

Christian city under Constantine the Great. Constantine built the first Church of the Holy Sepulcher over the supposed site of Christ's burial, but this church was burned by the Persians in 613. This period of prosperity, prolonged by a succession of Christian emperors, was suddenly terminated in 636 by the conquest of the Mohammedans under the Arabian caliph Omar. In 1099 the Crusaders took Jerusalem by storm and made it the capital of a Christian monarchy, which with difficulty maintained its existence till 1187, when it was finally overthrown by Saladin and the city again came into the power of the Mohammedans. In 1517 Jerusalem fell into the hands of the Turks and has remained to this day a part of the Ottoman Empire.

Modern Jerusalem is surrounded by a high wall, pierced by eight gates, through which roads lead into the surrounding country. Jaffa, Bethlehem, Hebron and Jericho and the Dead Sea are all connected with the city by good roads. The wall as it stands at present was built by Solyman the Magnificent in the sixteenth century and occupies practically the same place as the walls during the time of the Crusades. The most important gates are the Jaffa gate, at the west; the Damascus gate at the northwest, and another gate which has been opened to the north of the Jaffa gate. Outside the walls to the northwest is a suburb, the new part of the city. The town within the walls covers an area of 210 acres, 35 of which are occupied by the Temple enclosure, which is called Haram-esh-Sherif. The remaining space is divided into different quarters, the two Christian quarters taking up the western portion, the Mohammedans having the northeast and the Jews the southeast. The walls are irregular, and the city is also laid out in the most irregular way, with narrow, tortuous streets. The chief interests in Jerusalem are still its historical places. The Temple, or Dome of the Rock, sometimes wrongly called the Mosque of Omar, stands upon the summit of Mount Moriah. This building has eight sides, each 68 feet long, and four doorways, and the whole is covered with porcelain tiles of various colors. The dome is 98 feet high and 75 feet in diameter and is made of wood. The present shrine was built in 688 by Abd-el-Melek. The Church of the Holy Sepulcher is one of the most interesting buildings and is believed by many to cover the tomb of Christ. The first church was built by Constantine in 326 A. D., and since that time

many churches have been built. The present building was completed in 1810. The Tower of David, the mosque known as the Tomb of David, and the Via Dolorosa, or "Way of Sorrows," are other interesting features.

Jerusalem is a busy mercantile place; it has modern hotels, various educational and religious institutions and numerous stores, all of which are in strong contrast to the Jerusalem of the past. The principal industries now are the manufacture of ornaments, carved in mother-of-pearl, and various articles made from olive wood. These articles find ready sale among the 15,000 to 20,000 tourists and pilgrims who annually visit the city. The climate is not unhealthful, but the unsanitary condition of the city, its filthy streets and crowded population, result in a heavy death rate. The permanent population of the city is not far from 60,000, of whom over half are Jews, one-sixth Christians and about the same number Mohammedans.

Jessamine, *jes'sa min*. See JASMINE.

Jester or Court Fool, a buffoon or person maintained by the noble and wealthy to make sport by jests and merry conceits for them and their friends. The professional jesters usually wore a dress of motley colors and a cap, or cowl, of gay colors, furnished with bells and asses' ears, or crowned with a cock's comb. Several of the court jesters made names for themselves in history.

Jesuits, *jez'u its*, or **Society of Jesus**, the most celebrated of all the Roman Catholic religious orders, was founded in the sixteenth century by Ignatius Loyola (See LOYOLA, IGNATIUS OF), and was established by a papal bull in 1540. The first general of the order was Loyola. The members, in addition to the usual vows of poverty, chastity and implicit obedience to their superiors, were bound by a fourth vow, to go whithersoever the pope should send them, as missionaries for the conversion of infidels and heretics, or for the service of the Church in any other way. Popes Paul III and Julius III, seeing what support they might have in the Jesuits against the Reformation, granted to them privileges such as no body of men, in Church or State, had ever before obtained. Their general was invested with unlimited power over the members, the dispersion of whom throughout society was made the basis of the order. The constitution of the body was drawn up in great part by Loyola himself, but the second general, Laynez, had much to do in directing its early movements.

The order soon approved itself to the pope by its zealous activity and its success against the growing power of Protestantism. The Jesuits carefully avoided all appearance of spiritual pride, often wore the ordinary garb of the country and generally dealt with all matters in a spirit of worldly policy and accommodation to circumstances. In Europe they became the teachers of the higher classes and carried out on a grand scale improvements in the system of instruction. The young nobility were sent almost exclusively to them, even from Protestant countries, to be educated.

At an early date the Jesuits began to send missionaries to heathen nations. The greatest of these was Saint Francis Xavier, a close friend of Loyola. He is often called the "Apostle of the Indies," because his first work was done in India. He was not only the means of converting thousands to Christianity, but had a supreme faculty for organizing his converts into communities under the care of competent native teachers. His work in Japan was also remarkably successful.

The story of the work of the Jesuit missionaries in America is most thrilling. Garnier, Daniel and others were shot, and De Brébeuf and Lallement were burned at the stake. Marquette discovered the Mississippi and explored it as far as the mouth of the Arkansas. Other Jesuits from Mexico reached the Pacific coast and established the missions of California. The records, or *Relations*, of the French missions have been published recently in America, forming 72 volumes of valuable historical matter. Members of the English and Spanish Orders also came to America at an early date, and many of their records have also been preserved.

Wherever the Jesuits went they were considered as the special upholders of the papacy and the most faithful defenders of the Roman Catholic Church. This close adherence to the pope often made their position insecure, even in Catholic countries. Finally, in 1764, the united efforts of their enemies in France brought about their suppression by royal edict throughout the French dominions. This example was followed within a few years by the other Bourbon courts—Spain, Naples, Parma and Modena. In 1773 Pope Clement XIV issued the brief *Dominus ac Redemptor Noster*, by which, without entering in any way into the justice of the charges made against the Jesuits, but acting solely on the motive of "the peace of the Church," he sup-

pressed the society in all the states of Christendom. In all the Catholic countries, except Spain and Portugal, the members were, however, allowed to remain, and as individuals they wisely continued their ministerial or literary work. In 1814, by the bull *Solicitude Omnium Ecclesiarum*, the Order was reestablished in all Christendom.

Since then the Society of Jesus has flourished in all parts of the world. It is the most zealous of all missionary bodies of the Church and has over 3000 priests in heathen lands. They are foremost, too, in the work of education. Their preparation for this work is comprehensive and thorough, consisting of a seven years' course of study, embracing the humanities, philosophy and science, and must be completed by each candidate for orders. He is then sent to teach in a Jesuit college for five years. During this time he is not confined to one class, but is advanced each year with his pupils, thus providing for his own mental development as well as the consistent progress of his pupils. The Jesuit system of education was completed in 1599 under Acquiviva, the fifth general of the society. At the time of his death in 1615 the society had 272 colleges. By the middle of the eighteenth century there were 728 colleges, with about 300,000 students. Notwithstanding the losses sustained during the period of suppression, in the year 1900 the Jesuits had more than 60,000 students in their colleges. In the United States they have colleges in New York, Baltimore, Boston, Worcester (Mass.), Washington, Georgetown (D. C.), Jersey City, Fordham (N. Y.), Cleveland, Cincinnati, Buffalo, Detroit, Milwaukee, Chicago, Omaha, Saint Louis, Galveston, Mobile, New Orleans, Saint Mary's (Kan.), Denver, San Francisco, Santa Clara (Cal.) and Spokane.

Jesuits' Bark. See PERUVIAN BARK.

Jesus Christ, the founder of Christianity, was born in Bethlehem, Judea, according to the generally accepted chronology in the year of Rome 750, that is, 4 B. C. This apparent discrepancy in date is due to an error that was made when the Christian calendar originated with Dionysius, A. D. 556. He fixed upon the year of Rome 754 as that in which Christ was born. Later information proved beyond a doubt that this date should have been 750, which gives the birth of Christ four years before the beginning of the Christian era according to the calendar of Dionysius. The mother of Jesus was Mary, who was probably a descendant of David, and her husband, Joseph, was also a descendant of

the same family. The birth of the holy child occurred in a manger at a public inn in Bethlehem, where Joseph had gone to be registered in accordance with the Jewish law relating to taxation.

The miraculous conditions connected with his birth prove to the satisfaction of most followers of Christianity that Jesus was of divine origin. His parents remained at Bethlehem for some time. The infant Savior was circumcised on the eighth day, and at the end of the fortieth day he was presented in the Temple, and his mother, according to the Jewish law, made the customary offers for her purification. Soon after this he was visited by wise men, or Magi, from the East, who claimed to have been guided to the spot where he was by the miraculous appearance of a star. Inquiries of these men as to where the child who was to be king of the Jews was born, led Herod (at that time Roman ruler of Judea) to cause all the male children in Bethlehem under three years of age to be put to death. Joseph, however, was warned by an angel, and he fled with Mary and Jesus into Egypt, where he remained for a few months, until after Herod's death, when the holy family returned and took up their residence at Nazareth. Here Jesus lived and grew to maturity, and because of this he is frequently called the Nazarene.

Of the boyhood and youth of Jesus almost nothing is known. The only authentic account given is that of his appearance in the temple when twelve years of age (*Luke* II, 46-50). All legends concerning his life previous to his public ministry are without foundation, but it is probable that he remained in the family at Nazareth and engaged in the same work as his father, who was a carpenter.

The public ministry of Jesus was preceded by the preaching of John the Baptist, who proclaimed the coming of the kingdom of God and called men to repentance. Jesus was baptized by John, and at the time his divine nature was manifested by the miraculous appearance of the holy spirit in the form of a dove and by a voice from heaven saying, "This is my beloved son, in whom I am well pleased." Following the baptism, Jesus retired into the wilderness of Judea, where he was subjected to various temptations. After the temptation he was pointed out by John as the Son of God, and some of John's disciples from that time became his followers. His first public appearance was at the marriage in Cana of Galilee, where he wrought the miracle of turning water into wine. He then visited

Capernaum, appeared in Jerusalem at the time of the Passover and revealed his majesty and power by cleansing the Temple of those who were changing money and selling animals for sacrifice. His works and teachings immediately aroused the opposition of the leaders of the Jews and, finding that this work in Judea was to be rejected, he departed into Galilee. During the remainder of the first year of his ministry he preached at Nazareth, where the people attempted to cast him over a precipice because of his teachings; then at Capernaum, where he called the apostles Andrew, Peter, James and John. After the calling of his disciples he began his first circuit through Galilee. During this occurred the Sermon on the Mount; also the Sermon in the Boat, which was followed by the miraculous draught of fishes. Near the close of this year he called Levi, or Saint Matthew, who became one of his most devoted followers.

The second year's ministry began with the attendance upon the Passover at Jerusalem and the healing of the lame man at the Pool of Bethesda. Following this were several other miracles, followed by discussions with the Pharisees and other leaders of the Jews, in which Jesus set forth the doctrine of the new dispensation and showed clearly the difference between the underlying principles of the Jewish law and the ceremonials largely practiced at that time. This increased the already growing opposition and was followed by the sending out of the twelve apostles to promulgate the doctrine of Christianity. After the visit to Jerusalem, Jesus began his second general circuit through Galilee. This circuit was characterized by the performing of a number of miracles and the relating of some of the most important parables in the New Testament, among them those of the sower, of the tares, of the mustard seed, of the leaven and of the treasure. This was followed by the third general circuit, during which occurred the death of John the Baptist, the feeding of the five thousand and the walking on the water.

The third and last year of Jesus's ministry was by far the most important and included many discourses, miracles and parables. The great events of this year were the Transfiguration, his appearance at the Feast of Tabernacles, the raising of Lazarus, which so aroused the envy of the Jews that they resolved upon putting him to death, and the events of the last week before the crucifixion, generally known as Passion Week. As this week drew near, Jesus prepared to eat the last Passover with his dis-

ciples. On the first day of the week, which is still celebrated as Palm Sunday, he made his triumphal entrance into Jerusalem. During the next two days he spent his time in Jerusalem, cleansing the Temple and delivering discourses in which he used a number of parables to teach the truths which he wished to establish, after which he retired to Bethany. On Wednesday he gave a warning of the betrayal, and on the following day he ate the last Passover with his disciples. After the Passover meal, having been betrayed by Judas, he was arrested in the Garden of Gethsemane, brought before the high priest Caiaphas, condemned by the Jewish sanhedrin and early on Friday morning sent before Pilate, the Roman governor of Jerusalem, in order that the sentence of death might be legally confirmed. By Pilate he was released to the Jews, by whom he was crucified on that day. After his death the body was taken from the cross and buried by Joseph of Arimathea and Nicodemus. The tomb in which the body of Jesus was laid was one belonging to Joseph, and was in a garden near the place of crucifixion. On the morning of the first day of the week, or the third day after his death, Mary Magdalen and other women with spices hurried to the tomb in order to complete the work of embalming the body, but they found the stone rolled away from the door of the tomb and the place where Jesus had lain occupied by an angel, who told them that Jesus had risen. See RESURRECTION; SABBATH.

After his resurrection Jesus remained on earth for forty days, during which time he appeared eleven times to his disciples and followers. At the last gathering on the Mount of Olives he ascended into heaven and was received by a cloud out of their sight.

Jesus reënforced his teaching by miracles and by parables. His miracles were evidently for the purpose of convincing the people of his divine origin and power. They were thirty-five in number and ranged in importance from the turning of water to wine to the raising of the dead to life. Most of them were connected with the healing of disease, and with few exceptions all of them were for the welfare of those upon whom or in whose favor they were wrought. The parables, thirty-three in number, contain the best illustrations of moral and religious truth to be found anywhere in literature. So broad is their application that the truths which they teach are accepted by the non-Christian as well as by the Christian world.

Of the many works treating of the life and teachings of Jesus Christ, the following are authentic and are the most satisfactory to the general reader: For young readers, *The Children's Life of Jesus*; for adult readers, Cunningham Geikie's *Life and Words of Christ*; Ederstein's *Life and Times of Jesus the Messiah*; S. H. Andrews's *Life of Our Lord upon the Earth*.

Jet, a variety of bituminous coal, which is very hard and takes a high polish. It is used for ornaments. It was called *Gagates* by the Romans, because it was first obtained near the mouth of the river Gagas in Syria.

Jet'sam. See FLOTSAM, JETSAM AND LIGAN.

Jetty, an artificial embankment, extending into the sea or some other body of water. Jetties are made of piles, mattresses of wood and stone and of stone alone. They may be constructed for piers or breakwaters, but in the United States the term is usually applied to embankments at the mouth of a river or harbor for the purpose of deepening the channel. The most noted illustration of this use of jetties is at the mouth of the Mississippi River. This river empties into the Gulf of Mexico by several channels and deposits annually a large quantity of silt, which made the channel so shallow as to prevent ocean-going vessels of large size from ascending the river. In 1874 Captain James B. Eads recommended the construction of jetties on the Southwest Pass as a means of deepening the channel, and the following year he was authorized to construct the jetties. The east jetty has a length of 11,800 feet, and the west, a length of 7800 feet. Rows of piles 1000 feet apart were first driven to mark the position of the dikes. The jetties are constructed of mattresses, made by binding together willows with planks and dowells. The willows were cut 15 feet long, and each mattress consisted of four layers, each crossing the one beneath it. The mattresses were 100 feet long; for the bottom course they were 50 feet wide, but were narrower for each succeeding course until those of the upper course had a width of 20 feet. The mattresses were sunk by piling stones upon them. As they filled with silt they continued to settle in the bed of the river until they were immovable. Within two years from the time of their completion a thirty-foot channel was secured, and it has been maintained ever since. Since their construction these jetties have been repaired and improved several times. See MISSISSIPPI RIVER.

Jev'ons, WILLIAM STANLEY (1835-1882), an English writer on logic and political economy,

born at Liverpool. He was educated at University College, London; held an appointment in the royal mint in Australia from 1854 to 1859; was appointed professor of logic, mental and moral philosophy and Cobden lecturer on political economy in Owens's College, Manchester, and later became professor of political economy in University College, London, a post which he resigned in 1881. Among his works are *Elementary Treatise on Logic*, *Theory of Political Economy*, *Principles of Science* and many essays and addresses on economic questions. Those entitled the *Coal Question*, the *Value of Gold and Money* and the *Mechanism of Exchange*, may be specially mentioned.

Jew, THE WANDERING, a legendary personage regarding whom there are several traditions. One of the most common is that he was a cobbler at whose house Jesus, overcome with the weight of the cross, stopped to rest, but who drove him away with curses. Jesus is said to have replied, "Truly I go away, and that quickly; but tarry thou till I come." Since then, driven by fear and remorse, the Jew has wandered, according to the command of the Lord, from place to place and has never yet been able to find a grave.

Jew'elry. The collective name applied to precious stones mounted for wear, and to small ornamental works in gold, silver, mixed metals, amber, coral, and other materials. The use of personal ornaments dates from the earliest periods of which we have any knowledge, and it characterizes every part of the human race, whether civilized or savage. It is probable that the wearing of gold and silver ornaments immediately followed the discovery of those metals. Probably gold, from the form in which it is usually found and the beauty of its color, was the first to be used in this way, and also, from its ductility and capacity of receiving polish, it was the first to invite artistic skill in its working. Gold ornaments, displaying a high degree of skill in their manufacture, have been recovered from the ruins of Mycenae and Hissarlik, and from the tombs of ancient Egypt. The gold work of ancient Egypt, though executed nearly 3000 years ago, is of the highest quality, and in many points of excellence it would be impossible to surpass it by the most improved methods of modern times.

Many beautiful specimens of the work of the ancient Greek and Roman jewelers are preserved in the museums of Europe, and a large number of very interesting specimens have been obtained

from the tombs of Etruria. At the present day the Oriental jewelers preserve the same primitive methods of working that prevailed centuries ago. Their great manual dexterity and fine sense of color and beauty, however, enable them to obtain by simple means some very excellent results, and the work they produce, though unequal in finish to that of European workmen, is generally perfect in design and combination. New York is the chief center of the jewelry trade of the United States. In Europe the great centers for the production of jewelry are to be found in the cities of Paris, Vienna, London and Birmingham.

Jew'ett, SARAH ORNE (1849-1909), an American story writer, born in Berwick, Maine. Miss Jewett's work has consisted chiefly of short stories of New England life, remarkably sympathetic and intimate. She deals with aspects of life and character which are gentler and brighter than those portrayed by Mary E. Wilkins Freeman. *A Marsh Island* and *The Country Doctor* are novels.

Jewfish, the name given to two species of large fishes well known in American waters. The one, known also as the *guasa*, or *black grouper*, sometimes reaches the weight of seven hundred pounds. It has a large, flat head and huge mouth and is olive-green in color. This fish is common around Mexico, Florida and the West Indies. The other inhabits the California coast, often weighs five hundred pounds, is from five to seven feet long and has flesh of excellent quality.

Jews, the name given to the Hebrews after their return from their captivity in Babylon. They are a religious people, fond of home and their children, shrewd in money matters and intellectual. In form and feature they are short, with dark hair and eyes, a swarthy complexion, full lips and a characteristic nose.

The early history of the Jews is obtained from the Old Testament, which, in the *Pentateuch*, *Joshua*, *Judges*, *I* and *II Samuel* and *I* and *II Kings*, gives a history from the creation of the world to the destruction of Jerusalem by Nebuchadnezzar, in 586 B. C. The works of Josephus and the records of Egypt contribute also to the history. In 930 B. C. these people were divided, and they were known thereafter as the tribes of Israel, occupying the northern part of Palestine, and the tribes of Judah, occupying the southern part. Sargon, king of Assyria, took the northern tribes captive in 722 B. C. The kingdom of Judah paid tribute to the Assyrian government, but was not carried away captive till 586, when

Nebuchadnezzar besieged Jerusalem and took the inhabitants to Babylon; then independence of the Hebrew nation came to an end. Cyrus, after overthrowing the Babylonian kingdom, gave the Hebrews permission to return to Jerusalem and rebuild their Temple. The "Priestly Code" brought from Babylon by Ezra was adopted then, and the real Jewish history began.

After the time of Alexander the Great the Jews had to pay tribute to the Egyptians and to the Selucid rulers in Syria. Many went to Egypt, and under the advantages they enjoyed there they became well versed in science, art and statesmanship. The Greek translation of the Bible, the *Septuagint*, was produced at this time. Antiochus Epiphanes, about 170 B. C., forbade, in Jerusalem, Jewish sacrifices, circumcision and the observance of the Sabbath. Altars to idols were built in the small towns, and the people were compelled to observe Greek rites. Judas Maccabeus and his brothers Jonathan and Simon succeeded in gaining a victory over the Syrians in 169 B. C. This family continued in power till the capture of Jerusalem by Pompey, 63 B. C., but the last male representative, Antigonus, was put to death by Herod in 37 B. C. The Herodian line succeeded. In 6 A. D. both Judea and Syria came under Roman procurators. Claudius gave authority over Judea to Herod, who gained for the Jews Roman citizenship and other privileges. After Herod's death, the Roman governors came into conflict with the Jews, and this led to the destruction of Jerusalem by Titus in 70 A. D. and the banishment of the people. The final overthrow of this people was brought about by the capture of Bethar, the Jewish stronghold, 135 A. D. Many Jews in 70 A. D. went to Arabia, where they gained considerable power. Mohammed regarded them favorably till he found they would not accept his religion, when he began persecuting them. Many went to Syria and Mesopotamia. In Spain the Jews became famous for their learning and were allowed free worship in their religion and were nearly on terms of equality with the Moors. In the fourteenth century, they were compelled to be baptized and to accept the Christian religion. Those who objected were persecuted or even murdered. Under Ferdinand and Isabella, all who refused to become Christians were commanded to leave Spain, taking neither silver nor gold with them. Many hundred thousand left, to find almost every country hostile to them. Those who went to Portugal were compelled to leave in 1496 by order of King Emmanuel.

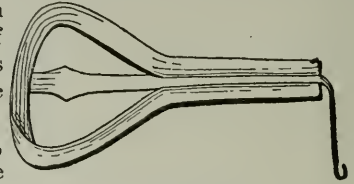
Since 1837, the Jews have been allowed to return to Spain, but very few have taken advantage of the permission. In the eighth and ninth centuries, the Jews of France were well treated, but during the Crusades they were persecuted and many were massacred in a most horrible manner.

The first real settlement of Jews in England was made under William the Conqueror, who favored them. But when their wealth increased they became very unpopular, and in 1253 their condition became so unbearable that they asked leave to go from England. They were persuaded to remain, but in 1290, under Edward I, they were driven out. Many went to Germany and France, where they received the same treatment that had met them elsewhere. For three hundred years, no Jews were allowed in England. In 1655, Cromwell favored their admission, but they did not go till the time of Charles II. Since then, they have by degrees gained access to public offices, and in 1885 they were admitted to Parliament. In France, since 1790, Jews have had full rights of citizens, and in 1806, under Emperor Napoleon, they were allowed religious liberty. After alternating periods of freedom, persecution and banishment in Russia, the Jews since 1882 have been driven out of all professions and offices. More than 800,000 have left the country and settled in America and parts of Europe, yet they are more numerous in Russia than in any other part of the world. In Hungary, their position is equal to that of the Christians. In Holland they have never been subjected to persecution. Since 1867, a Jew in Austria may possess land.

In 1654, Jews settled at Providence and Newport in the United States, since which time they have increased in numbers, hundreds of thousands coming from Russia, who have made for themselves homes in the large cities. A few Jews took part in the War of 1812 and the Mexican War, and many were on each side in the Rebellion. The total number of Jews in the world is estimated between seven and eleven millions. Over one million are in the United States. The Jews observe the seventh day, or Saturday, as their Sabbath, but commercial relations have led to their keeping their business houses open on Saturday, and in some places even Saturday worship has been entirely done away with. Schools for the training of men for the ministry have been in existence in Germany since the early part of the nineteenth century. In the United States is the Hebrew Union College at Cincinnati; the Jewish Theological Seminary,

established in New York in 1886; Gratz College, founded in Philadelphia in 1893. Baron de Hirsch has helped the founding of manual training and technical schools in New York, Philadelphia, Chicago and other cities.

Jew's-harp, a toy musical instrument. It is held between the lips, and the sound is produced by the motion of a tongue of steel, which is struck with the finger.



JEW'S HARP

Jeypore, *ji por'*. See JAIPUR.

Jhelam, *je'lum*, or **Jhelum** (ancient Hydaspes), a river of India, the most westerly of the five great rivers that intersect the Punjab. It rises at Vernag, in Kashmir, and flows northwest to Wulur Lake. Then it flows southwest and then northwest up to Mazufurubad, where it bends southward, becoming the boundary between Kashmir and the Punjab. It flows into the Chenab after a course of 490 miles. It is for the most part navigable.

Jigger, **Chigger** or **Chigoe**, a very curious insect closely resembling the common flea but of minute size. In the United States the name is given to a minute scarlet insect, found in the grass and weeds of the Southern states. It attaches itself to the skin of man and burrows beneath it. Here its eggs are deposited, and troublesome itching sores result unless the insects are killed. Salt water will relieve the itching.



JIGGER

Jilolo, *je lo'lo*. See GILOLO.

Jimson Weed. See STRAMONIUM.

Jingo, the name given in modern politics to an individual or party who habitually displays a warlike attitude. The name arose from the slang expression, *by jingo*, and was first used in 1877 in the contest between the Liberals and Conservatives in England as to the policy of the government in regard to the trouble between Turkey and Russia. The followers of the Conservatives, in this case the party who desired war, were accustomed to sing a doggerel, as follows:

"We don't want to fight;
But, by jingo, if we do,
We've got the ships,
We've got the men,
We've got the money, too."

The same term is used in the United States, where it conveys much the same idea as the more common *spreadeagleism*.

Jinn, in Mohammedan mythology, a race of genii, angels or demons, fabled to have been created several thousand years before Adam. They are not immortal; they are to survive mankind, but to die before the general resurrection. Some are good and obedient to the will of God; others are disobedient and malignant. They can assume the shape of the lower animals and are visible or invisible as they please. Their chief residence is the mountain Kâf, in Arabia.

Jinrikisha, *jîn rik'e shah*, a light two-wheeled carriage, provided with a hood and drawn by a man. Near the outer end of the shafts is a crosspiece, which is used by the runner in pulling the carriage. By attaching cords to the crossbar, one or more out-runners can assist when more than ordinary speed is required or when the load is especially heavy. The puller is known as the *hiki*. He can go at a rapid pace and for long distances, frequently covering from thirty to forty miles in a day. The jinrikisha is in general use in Japan, India and some portions of China. Its invention is attributed to an American Baptist missionary, named Goble. The vehicle has also been used to some advantage in the army.

Joachim, *yo'a Keem*, JOSEPH (1831–), a famous Hungarian violinist. When twelve years of age he appeared in concert at Leipzig, attracting the attention of the musical world, but continued to study for several years. After 1849 he received several important appointments at court in Europe, and in 1868 he became principal of a school of harmony at Hanover. His playing was characterized by remarkable sincerity and emotion and by wonderful purity of tone. He was the founder of a stringed quartette which has never been equaled.

Joachin, *wah keen'*, **Miller**. See MILLER, CINCINNATUS HEINE.

Joannes, *jo an'eez*. See MARAJÓ.

Joan, *jo an'*, of **Arc**, THE MAID OF ORLEANS (1412–1431), was born in the village of Domremy, France, of peasant parents. While she was still a girl she was deeply affected by the woes of her country, much of which was in possession of the English. In 1427 Orleans was being besieged by the English, and its fall would have ruined the cause of France. At this time Joan, who had been noted for her solitary meditations and pious enthusiasm, began, as she declared, to see visions and hear angelic voices, which finally

called upon her to take up arms for Charles, to raise the siege of Orleans and to conduct Charles to Rheims to be crowned. At first she was regarded as insane, but eventually she found her way to the king and his counselors, and having persuaded them of her sincerity, received permission to hasten to the deliverance of Orleans. In male dress, fully armed, she bore the sword and the sacred banner, as the signal of victory, at the head of the army. The first enterprise was successful. In April, 1429, she entered Orleans with supplies, and by the bold sallies to which she animated the besieged, the English were forced from their entrenchments and compelled to abandon the siege. Other successes followed; Charles entered Rheims in triumph, and at his anointing and coronation Joan stood at his side. She was wounded in the attack on Paris, where Bedford repulsed the French troops, but continued to take part in the war till May, 1430, when she was taken prisoner by the Burgundians and sold to the English. She was taken to Rouen, and after a long trial, accompanied with many shameful circumstances, she was condemned to death as a sorceress by the ecclesiastical tribunal. On submitting to the Church, however, and declaring her revelations to be the work of Satan, her punishment was commuted to perpetual imprisonment. But pretexts were soon found to treat her as a relapsed criminal, and as such she was burned at Rouen, May 30, 1431. She died with unshaken courage.

Job, *jobe*, the hero of an ancient Hebrew poem, which forms one of the books of the Old Testament. Job, an upright man with a family of seven sons and three daughters, with large herds and numerous servants, is suddenly, with the permission of Jehovah and by the agency of Satan, deprived of his possessions and his children and smitten with a sore disease, yet he submits patiently to the divine will. Three friends come to console him, and a large part of the poem is occupied with the speeches of his friends, who attribute his misfortunes to wickedness and hypocrisy, and with his replies to them. Near the close, God himself is introduced answering Job out of a whirlwind. In the sequel Job is delivered from his calamities, lives 140 years, becomes richer than he had been before and begets seven sons and three daughters. The design of the book seems to be to enlarge men's views of the providence of God. The basis of the story was probably traditional, and it is not known at what time the book of *Job* was written.

Job's Tears, an annual grass, about a foot in height, a native of the East Indies and Japan, sometimes grown in hothouses. The hard, round, shining seeds, from whose fanciful resemblance to tears it derives its name, are used both for ornament and as food.

Jo'el, one of the twelve minor prophets. Nothing is known of his life. He is generally supposed to have been contemporaneous with Hosea and Amos.

Johannesburg, *yo hahn'nes burg*, a city in Transvaal Colony, situated 30 mi. s. by w. of Pretoria and connected by railway with Cape Town, Port Elizabeth, Durban and Delagoa Bay. It is a modern town in every respect, with broad, well-planned streets, electric lights, telegraph and telephone lines and street cars. The chief public buildings are the courthouse, the public library, the stock exchange and a number of theaters. The city was built by the foreigners who came to that locality in large numbers because of the gold mines near at hand, but most of whom, at the outbreak of the Boer War, removed. Population in 1896, 48,330; in 1901, 158,580. The city was captured by the English in May, 1900.

John, called *the Baptist*, the forerunner of Christ, was born six months before Jesus (their mothers were cousins), of a Levitical family in Judea. He lived a life given up to solitary meditations till A. D. 26, when he began to preach in the deserts of Judea, announcing that the kingdom of heaven was at hand and proclaiming himself the harbinger of the Messiah. John baptized many converts and testified to the higher mission of Jesus at the time of Christ's baptism in the Jordan. To gratify a vindictive woman, Herod Antipas, tetrarch of Galilee, caused him to be beheaded in prison.

John, the name of twenty-three popes of Rome, from 523 A. D. to 1419, among whom are the following: **JOHN I** (*Saint John*), pope from 523 to 526, was sent to Constantinople by Theodoric to induce the emperor Justin to adopt milder measures toward the Arians, and on his returning without success Theodoric threw him into prison, where he died. **JOHN XII** (*Octavianus*), pope from 955 to 964, gained the support of Otho, and in his gratitude crowned Otho emperor of Germany. He presently conspired against the emperor, who threatened to depose him. John XII introduced the custom of the pope's assuming a new name on his accession. **JOHN XIX**, pope from 1022 to 1029, crowned Conrad II in the presence of Canute, the Danish king of England.

JOHN XXII, pope from 1316 to 1334, possessed extraordinary abilities, was a patron of learning, wrote some medical treatises and was a zealous worker for the propagation of the faith in distant lands. He lived a simple, student's life himself, but collected vast sums of money for the Church. **JOHN XXIII**, pope from 1410 to 1415, was a Neapolitan. While cardinal, he was prominent in the Council of Pisa. As pope he called the Council of Constance, by which he was, however, deposed. After four years' imprisonment he was released and made dean of the Sacred College.

John (about 1167-1216), king of England, the youngest son of Henry II. As he was left without any particular provision, he was given the name of Lackland; but his brother, Richard I, on his accession conferred large possessions on John. John obtained the crown on the death of Richard in 1199, although the French provinces of Anjou, Touraine and Maine declared for his nephew, Arthur of Brittany, who was lineally the rightful heir. A war ensued, in which John recovered the revolted provinces. In 1205 began his great quarrel with the pope, regarding the election to the see of Canterbury, to which the pope had nominated Stephen Langton. The result was that Innocent III laid the whole kingdom under an interdict and in 1211 issued a bull deposing John. Philip of France was commissioned to execute the decree and was already preparing an expedition when John made abject submission, even agreeing to hold his kingdom as a vassal of the pope (1213). John's arbitrary proceedings led to a rising of his nobles, and he was compelled to sign the Magna Charta, or Great Charter, June 15, 1215. But John did not mean to keep the agreement, and obtaining a bull from the pope annulling the charter, he raised an army of mercenaries and commenced war. The barons, in despair, offered the crown of England to the dauphin Louis, who accordingly landed in England in 1216 and was received as lawful sovereign. The issue was still doubtful when John was taken ill and died.

John II, called *the Good* (1319-1364), king of France, succeeded to the crown in 1350. In 1356 he was defeated and taken prisoner by the Black Prince at the Battle of Poitiers, and he was detained at Bordeaux and at London till released at a heavy expense to his country by the Peace of Brétigny in 1360. On learning that his son, the duke of Anjou, who had been left as a hostage in England, had escaped, John returned to London, where he died.

John III Sobieski (1624–1696), king of Poland, son of a Polish captain. He served in the French army, returned to Poland to assist in repelling the Russians in 1648 and greatly distinguished himself in several campaigns, winning in 1667 the rank of commander in chief of the Polish army. On the death of the Polish king, in 1673, John was chosen his successor. His most celebrated achievement was the relief of Vienna, which was besieged by a great army of Turks, whom he decisively defeated in 1683.

John, KNIGHTS OF SAINT, or Knights Hospitalers of Saint John, afterward called *Knights of Rhodes* and finally *Knights of Malta*, were a celebrated military religious order, originating in a monastery founded at Jerusalem in 1048 by some merchants from Amalfi. The monastery was dedicated to Saint John the Baptist, and the monks, who were called Brothers of Saint John, or Hospitalers, cared for the poor and sick and assisted pilgrims. An order was founded in America in 1889.

John, SAINT, one of the apostles, often distinguished as *Saint John the Evangelist*, the reputed author of the fourth Gospel, three epistles and the Revelation, was the son of Zebedee and Salome and the brother of James. Previous to his call by Jesus he was a fisherman on the Sea of Galilee. His Gospel was written later than any of the others—according to some critics, to refute particular heresies—and contains fuller details of our Lord's conversation and discourses than the other Gospels and is also more doctrinal in character. Of the three epistles, the first has much resemblance to the Gospel; but the other two were considered doubtful even by the early fathers. After the death of Jesus, John continued at Jerusalem, and later he was at Samaria (*Acts* VIII, 14–25). Tradition handed down by the fathers declares that he died at Ephesus, and if he wrote the Revelation he must have been banished to Patmos. The time of his death is unknown.

John Bull. See **BULL, JOHN**.

John Dory, the common English name for a peculiar food fish found in the Mediterranean and elsewhere. It is less than twenty inches in length and has an enormous mouth. It is a voracious animal, though inert when not looking for food. A round black spot, which marks the middle of its side, has been the subject of many legends. By one it is said that these marks were left by the thumb and finger of Saint Peter when he took the tribute money from the fish's mouth.

Other species of the same genus are given the same name.

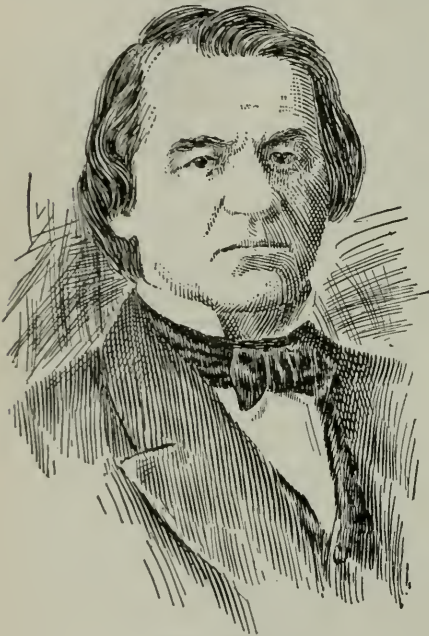
John of Gaunt, DUKE OF LANCASTER (1346–1399), fourth son of Edward III of England. He was created duke of Lancaster in 1362, served in the French wars and became governor of Guienne. On the death of his father-in-law, king of Castile, he assumed in right of his wife the title of king of Castile and invaded the kingdom to assert his claims, but subsequently relinquished them in favor of Henry of Castile, Pedro's successor, who became John's son-in-law. John's eldest son became king of England as Henry IV.

Johns Hopkins University, an institution of higher learning at Baltimore, founded by Johns Hopkins in 1867. His gift of \$7,000,000 provided for the establishment of a university and a hospital. The university has an endowment of \$3,500,000, a library containing 110,000 volumes, a faculty of 150 and an attendance of over 700 students. It has two departments, the philosophical department and the medical school, in each of which instruction is offered to both undergraduates and graduate students. The advantages offered for postgraduate work are especially attractive, and the university annually awards a large number of scholarships and fellowships to American students desiring to do research work in literature, science or medicine. The Maryland geological survey and weather bureau are closely connected with the university. Some of the most authentic works in the country on literature, history and scientific subjects are issued at frequent intervals by the departments under the title of *Studies*.

John'son, ANDREW (1808–1875), an American statesman, seventeenth president of the United States, born at Raleigh, N. C. Owing to the death of his father and the poverty in which the family was placed, Johnson received but little schooling. However, he educated himself by constant reading and by the aid of his wife. In 1826 he moved to Greenville in East Tennessee and took a prominent part in the politics of his locality and of the state, being elected to the state legislature several times. In 1842 he was chosen to Congress, and he was four times reëlected. He supported the annexation of Texas, the Mexican War and the compromise measures of 1850. In 1853 Johnson was chosen governor of Tennessee, and four years later he entered the United States Senate, where he attracted attention as spokesman of the radical

Union party. Returning to his state in 1861, he continued to labor for the Union cause and in the following spring was made military governor of Tennessee.

In 1864 he was nominated for vice-president on the Republican ticket and became president upon the assassination of Lincoln in the following April. Though at first a radical exponent of congressional reconstruction and favoring the severest measures toward the seceded states, he soon came under the influence of Secretary Seward and adopted a conciliatory



ANDREW JOHNSON

policy. He proclaimed general amnesty and ordered the establishment of provincial congresses in several states; but soon he was met by radical opposition on the part of Congress. The contest between the president and Congress continued with the greatest bitterness, President Johnson vetoing all the important reconstruction measures and Congress immediately passing them over his veto with insulting resolutions. The crisis in the struggle came when Johnson requested the resignation of Edward M. Stanton, secretary of war, who had opposed the president's policy. The Senate refused to ratify this removal, and the president refused to recede from his position. The result was an impeachment trial, the principal charges being violation of law in the removal of the

secretary, and insulting statements in the president's public speeches against Congress. After a long trial, presided over by Chief Justice Chase, the president was acquitted, the prosecution lacking one vote of the two-thirds necessary for conviction.

Though the Democrats had favored Johnson's policy, he had forfeited claims to leadership by deserting the party at the opening of the war, and he was not renominated, being succeeded by General Grant. Johnson's last official act was to proclaim pardon to all who had been concerned in secession. He immediately began a campaign for the Senate and was elected in 1875, but died in July of the same year. See RECONSTRUCTION; IMPEACHMENT.

Johnson, EASTMAN (1824-1906), an American artist, born at Lovell, Maine. From his boyhood he devoted himself to art. In 1849 he went abroad to study and, after visiting the principal European galleries, established himself in Paris. In 1858 he settled at New York and was in 1860 elected to the National Academy. Among his works are *The School of Philosophy at Nantucket*, *The Old Kentucky Home*, *Old Stage Coach* and *Husking Bee*.

Johnson, HERSCHEL VESPAIAN (1812-1880), an American politician and jurist, born in Burke County, Ga. He was educated at the University of Georgia, studied law, began practice at Atlanta and settled at Milledgeville, the capital, in 1844. He was appointed to the United States Senate by the governor, in 1848, where, at first a strong states' rights man, he soon became a loyal unionist. From 1849 to 1853 he was judge of the superior court of his state and for the following four years was governor. At the split in the Democratic party in 1860 he was nominated by the Northern Democrats for vice-president, and though defeated, he did his utmost to avoid secession; but he followed his state and was elected to the second Confederate senate. In January, 1866, he was elected to the United States Senate, but was refused admission. In 1873 he became judge of the superior court.

Johnson, JOHN A. (1861-1909), an American journalist and politician, born at Saint Peter, Minn. At the age of twelve he found employment in a printing office. Later he became editor of the *Saint Peter Herald*. He served one term in the state senate. In 1904 was elected governor of Minnesota and re-elected in 1907. His successful administra-

tion made him a prominent candidate for the Democratic nomination for president in 1908.

Johnson, JOHN, Sir (1742-1830), an American Tory leader, the son of Sir William Johnson, born on the latter's estate in New York State. He took part in the French and Indian War, and at the opening of the Revolutionary War he succeeded in inducing the Iroquois Indians under Joseph Brant, his father's protégé, to join the English. He also organized a Tory regiment, known as the "Queen's Own American Regiment," or the "Royal Greens." He was with Saint Leger in his campaign of the summer of 1777, and for two years he was an influential promoter of the Indian-Tory raids, including the Wyoming Valley and Cherry Valley massacres. He was defeated by Sullivan's army in 1779 and retired to Montreal. His New York estates were confiscated at the end of the war.

Johnson, REVERDY (1796-1876), an American statesman, born in Annapolis, Md., educated at Saint John's College and admitted to the bar in 1815. In 1817 he went to Baltimore, was elected to the state senate in 1821 and to the United States Senate in 1845, resigning his seat to become attorney-general in President Taylor's cabinet. He was again elected senator in 1863. In 1868 he was appointed minister to England, but was recalled in the following year, and thereafter he resumed his law practice, being connected with many famous cases.

Johnson, RICHARD MENTOR (1780-1850), an American statesman, vice-president of the United States, born in Kentucky. He was educated at Transylvania University, was admitted to the bar, became a member of the state legislature and in 1806 was elected to Congress, serving with slight interruption till 1819. He fought with great bravery in the war with Great Britain in 1812-1813 and, it is said, fired the shot which killed Tecumseh, at the Battle of the Thames. He was a member of the Senate from 1819 to 1829 and of the House of Representatives again until 1837, when he was elected vice-president on the ticket with Van Buren. He was a strong supporter of Jackson. Johnson was again nominee for vice-president in 1840, but was defeated and was an unsuccessful aspirant for the presidential nomination in 1844.

Johnson, ROSSITER (1840-), an American journalist and author, born at Rochester, N. Y. He was educated at the University of Rochester and after graduation entered jour-

nalism in Rochester and Concord, N. H. He held responsible positions on the staff of the *American Encyclopedia*, *The Annual Cyclopaedia*, *Encyclopedia of American Biography* and *The Standard Dictionary*. He also assisted in the compilation of numerous sets of literary masterpieces, including the *British Poets*, *Fifty Perfect Poems* and the *Little Classics* series. He was the author of unimportant works of fiction, some verse and numerous histories and biographies, of which the most important was probably a *History of the War of Secession*.

Johnson, SAMUEL (1709-1784), an eminent English author, son of a bookseller, was born at Lichfield. The most important part of his education was the wide reading in which he indulged in his father's shop. In 1728 he entered Pembroke College, Oxford, but was obliged by poverty to retire after three years, without taking a degree. For thirty years from this time he was engaged in a constant struggle with poverty. He served for a time as an usher in a school, but he was not fitted for this work and finally gave it up, turning to writing as a means of support. In 1735 he married the widow of a mercer, considerably older than himself, to whom he was sincerely attached. Up to the time of her death he remained devoted to her, and as she seems to have recognized his worth, the marriage was not unhappy. A school which Johnson started with the money his wife brought him soon failed; and in 1737, removing to London, he entered on his long course of literary toil. His reputation rose very slowly; the greater part of his time for many years was wasted on desultory and occasional efforts. A large proportion of his writings appeared in the *Gentleman's Magazine* or in pamphlets; and most of these are quite forgotten. His poverty was at times almost unendurable, and it is not strange that Johnson, always melancholy, grew more and more pessimistic, and that he expressed his pessimism in such poems as *London* and the *Vanity of Human Wishes*. When *Irene*, a tragedy which Johnson had written before coming to London, was brought out, he received some relief from his poverty.

From 1750 to 1752, and again in 1758, Johnson conducted periodicals modeled on the plan of *The Spectator*, but these, *The Rambler* and *The Idler*, with their essays in Johnson's formal, heavy style, were never popular. Meanwhile, from 1747, Johnson's attention was chiefly engaged by his *Dictionary of the English Lan-*

Johnson

guage, a work which appeared in 1755. The dictionary, though it raised his fame, added little to his worldly means; and when in 1759 his mother died, Johnson, to provide money for the funeral, wrote in one week the philosophical novel, *Rasselas*. In this poverty he lived until 1762, when he obtained from the government a pension of £300 a year. He was thenceforth in easy circumstances and could enjoy without restraint the society of Burke, Reynolds, Gibbon, Garrick, Goldsmith and others in the famous club which became so formidable a power in the world of letters. Although Johnson was uncouth in his manners and slovenly in his dress, he was looked up to by these men, and in fact he easily dominated the club. In 1763 his first interview took place with his famous biographer, James Boswell. In 1765 his intimacy with the family of Mr. Thrale began, a wealthy brewer, and in the same year his long promised edition of Shakespeare appeared. A tour to the Hebrides made in 1773, in company with his friend Boswell, was described in his *Journey to the Western Isles*, and his last literary undertaking was his *Lives of the Poets*, which was completed in 1781. He was buried in Westminster Abbey. Boswell's *Life of Johnson* gives us a better idea of the man than we can gain from his own works, because, eminent as he was in his day as a writer, he was still more revered and influential as a conversationalist, and many of his conversations Boswell has reported.

Johnson, THOMAS (1732-1819), an American statesman, born in Maryland. He studied law and soon entered politics, becoming an ardent patriot. He was chosen to the Continental Congress, where he moved the appointment of General Washington as commander in chief, and for a time he was at the head of the Maryland militia in the Revolutionary War. He served at different times as member of the provincial congress of Maryland, of the house of delegates and as governor, was an earnest advocate of the Articles of Confederation and in the Maryland convention vigorously supported the Federal Constitution. He was chosen one of the first justices of the United States Supreme Court, but declined the position of chief justice and also the office of secretary of state. He was a member of the commission that laid out the city of Washington, D. C.

Johnson, WILLIAM, Sir (1715-1774), a British-American soldier, born in County Meath, Ireland. In 1738 he came to New York to

Johnston

manage the estates of his uncle. He soon entered into close and friendly relations with the Indians through his honesty in dealings with them and was appointed to important offices by the governor of New York. On the outbreak of the French and Indian War, he was placed in full charge of the Indians in New York and performed important service. Because of his influence with the Indians, by which he persuaded them to remain loyal to England, he was granted £5000 and a baronetcy by Parliament. For other service in the French and Indian Wars, he was given a tract of nearly one thousand acres in the fertile Mohawk Valley and built an elaborate home known as Johnson's Hall, which became the nucleus of the city of Johnstown, N. Y.

John'ston, ALBERT SIDNEY (1803-1862), an American soldier born at Washington, Ky. He



ALBERT SIDNEY JOHNSTON

graduated at West Point, entered the army and fought in the Black Hawk War, but resigned in 1834 and went to Texas. He fought with the Texans in their war for independence, became commander of the Texan army and in 1838 was secretary of war of the new Republic. Resigning in 1840, he became a planter. At the outbreak of the Mexican War, he again entered the service of Texas, and at its close he became an officer in the United States army. In 1857 he won distinction in command of an expedition against the Mormons, exhibiting remarkable discretion and courage, both on the

march and in his negotiations with the Mormon leaders. He was brevetted a brigadier general, but at the opening of the Civil War resigned his commission and entered the Confederate army, being placed in command of the forces in the west. During the winter of 1861 he exhibited marked ability in the defense of Kentucky and Tennessee, and at Shiloh, in April, 1862, he won a brilliant, but temporary, victory, being killed while leading a charge at the crucial point of the battle. He won the esteem of military critics on both sides for his management of large forces and his courage in battle.

Johnston, ALEXANDER (1849-1889), an American historian, born in Brooklyn, N. Y. He was for several years professor of political economy at Princeton University, but is best known by his *History of American Politics*, a concise and useful manual; *History of the United States for Schools*, and *History of Connecticut*. He also edited *Representative American Orations*, contributed the article on the history of the United States to the *Encyclopedia Britannica* and assisted in the editing of Lalor's *Cyclopedia of Political Science*.

Johnston, JOSEPH EGGLESTON (1807-1891), an American general, born in Prince Edward County, Va. He graduated at West Point in 1829 in the same class with Robert E. Lee, took part in the Black Hawk War and in the Seminole War, but resigned in 1837, becoming a civil engineer. In the following year he entered the engineering service of the army and in 1846 became captain. He served with distinction in the Mexican War and was severely wounded at the Battle of Cerro Gordo, being brevetted major and colonel for his conduct there and lieutenant colonel for his gallantry at Chapultepec. In June, 1860, he became quartermaster general of the army, with the rank of brigadier general, but in the following spring he resigned and became brigadier general in the Confederate army and later full general.

He took part at the first Battle of Bull Run and for a time had full command of the Confederates in Virginia, but was wounded at Fair Oaks, being succeeded by Robert E. Lee. Later he became commander of the military Department of Tennessee, but was defeated by Grant at Jackson, while attempting to relieve Vicksburg. After the battles of Chattanooga, he became commander of all the Confederate forces in the southwest and conducted a brilliant retreat before General Sherman from Chatta-

nooga to the vicinity of Atlanta, winning a great victory at Kennesaw Mountain. He was superseded, however, by General Hood and was given an important command only at the insistent request of General Lee, who appointed him to resist Sherman's advance northward from Savannah. He was several times defeated, however, and surrendered April 26, 1865. After the war he engaged in business in the South, was elected to Congress from Virginia in 1876 and was appointed United States commissioner of railroads in 1885. Military critics agree in considering General Johnston one of the greatest commanders in the Civil War. Consult Hughes's *General Joseph E. Johnston*.

Johnston, MARY (1870-), an American novelist, born at Buchanan, Botetourt co., Va. She received a private education and first came to public notice by her novel, *Prisoners of Hope*, a story of colonial days in Virginia. A second romance with much the same setting, *To Have and to Hold*, appeared in 1899 and met with great success. A third, *Audrey*, with the same theme, also was well received. The last two were dramatized and created a favorable impression.

Johns'town, N. Y., the county-seat of Fulton co., 45 mi. n. w. of Albany, on the Cayadutta Creek and on the Fonda, Johnstown & Gloversville railway. The industries of the city are almost exclusively devoted to the production of gloves and mittens. In Johnstown and the neighboring city of Gloversville, there are 150 factories, which supply more than half of all the gloves that are used in the United States. The place was settled in 1760 and was named after Sir William Johnson, whose mansion, erected in 1761, is still standing. The courthouse and jail are also of historical interest, for both were built in 1772. Population in 1905, 9845.

Johnstown, PA., a city in Cambria co., 76 mi. e. of Pittsburgh, on the Conemaugh River, and on the Pennsylvania railroad and a branch of the Baltimore & Ohio. It is situated in an irregular and narrow valley at an elevation of about 1200 feet. The city became especially well known by the flood of 1889. Heavy rains had so swollen the streams that the dam across the south fork of the river, 12 miles east of the city, but 18 miles along the river, gave way and released the water in Conemaugh Lake. Johnstown and the neighboring villages in the valley were very soon submerged in a roaring torrent of water, and about \$10,000,000 worth of property

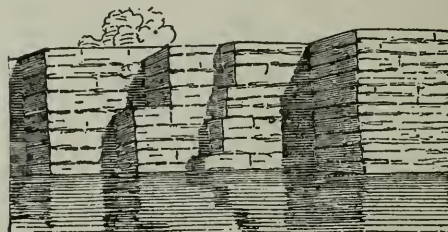
was destroyed, with a loss of at least 2235 lives. Aid was contributed by other cities, and the place was at once rebuilt. There are deposits of bituminous coal in the vicinity, and the city has extensive iron and steel works, coke ovens, tanneries, brickyards, manufactures of fire-clay products and other works. Important features of interest are the public parks, Grand View cemetery, Conemaugh Valley Memorial Hospital, Cambria Free Library, the high school building and the city hall. Johnstown was settled about 1790, but it was not incorporated until 1889. Population in 1900, 35,936.

Johore, *jo hor'*, an independent state at the southern extremity of the Malay Peninsula, with an area of about 9000 square miles. The country is densely covered with timber and rises into several mountain peaks, the highest being Mount Ophir, 4186 feet. The chief products of the country are gambier and black pepper. All kinds of fruit are plentiful. The climate is tropical but healthful. The capital is Johore, a small town 15 miles northeast of Singapore. Great Britain, by a treaty in 1885, was given control of the foreign affairs of Johore. Population, estimated at 200,000.

Joints, in anatomy, the joining of the bones. They may be classified as movable and immovable. (1) The ball and socket joints, found at the shoulders and the hips, admit great freedom of motion. In the ball and socket joint the rounded head of a long bone fits into a cavity made by other bones and is held in place by a loose sac, called a *capsular ligament*, and by surrounding muscles. In the hip the articulation is still further strengthened by a ligament attached to the head of the thigh bone and to the cavity. At the shoulder, the socket is not as deep as at the hip, hence there is much greater freedom of motion. (2) Hinge joints, which admit of motion in two directions, that is, can be bent and straightened, are found in the knee, the fingers, the toes and, in a modified form, between the lower jaw and the cranium. In this joint the bones articulate by ridges that fit into grooves. (3) Pivot joints, in which one bone rotates on another, as the first cervical vertebra on the second. The power to turn the hand over without moving the shoulder is due to a modified pivot joint at the elbow where the radius rotates on the humerus and over the ulna. (4) Gliding joints, which admit of but little movement, are found in the wrist and ankle. There are also slight movements between the vertebrae. Immovable joints are found

between the bones of the cranium and face. In movable joints the ends of the bones are covered with a smooth cartilage, which is kept moist by a secretion, called synovia, from a very thin membrane which surrounds the joints. This secretion serves the same purpose that oil does in a machine. Any dislocation in a joint should receive immediate attention, as swelling so soon follows as to make it difficult to replace the bones or, as physicians say, to reduce the dislocation. If medical aid is not at hand the joint should be kept in hot bandages. The same action should be taken in case of a *sprain*, an injury that if neglected may give permanent trouble. See **LIGAMENT**; **TENDON**.

Joints, in geology, the cracks or fissures which divide rocks into more or less regular blocks. They occur generally in systems, the joints being parallel and plane, those which run



JOINTS

parallel to the strike being called strike joints, those parallel to the dip, dip joints, and others, diagonal joints. The causes of joints are (See **DIP**) earthquakes and the contraction of rocks upon cooling or drying.

Joint Stock Company, a species of partnership in which a number of persons contribute funds, or *stock*, for the purpose of carrying on a trade or other profitable object. The management is vested in certain officers, usually president, vice-president, secretary and treasurer, and sometimes others, chosen by and under the direction of a board of directors chosen by the stockholders. The general body of shareholders takes no active part in the concerns of the company, beyond exercising a control over the acts of the directors on special occasions. The capital is generally divided into equal shares, each member holding one or more and, in proportion to this number, participating in the profits. No member can demand payment of his share from the company, but he may, without consent of his fellow members, transfer his share to another person. In nearly all the states these joint stock companies are now by

statute invested with some of the privileges of a corporation. Five or more persons, by subscribing their names to articles of association and filing these with the proper state officer, may form an incorporated company. It may be in one of three forms: (1) as a company limited by shares, where the liability of each member is limited to the amount unpaid on the shares which he has agreed to purchase; (2) as a company limited by guarantee, where the liability of each member is limited to such amount as he undertakes in the memorandum of association to contribute to the assets of the company if it should go out of business; (3) an unlimited company, where there is no limit to the liability of the members. In the first two cases the word "limited" must be added to the name of the company, and the amount of capital, object, place of business and declaration of the limit or the amount of guarantee must be entered in the memorandum of association, which must be accompanied by articles of association providing for the management of the company. See PARTNERSHIP; CORPORATION.

Joinville, JEAN, Sire de (1225-1317), a French chronicler. He early entered the service of Thibaut of Champagne, and in 1248 he raised a troop of knights and soldiers and accompanied Louis IX in his first crusade to the Holy Land. He rose high in favor with Louis, shared his captivity, returned with him to France in 1254 and spent much of his time at court. His *Histoire de Saint Louis*, which is one of the most valuable literary productions of the Middle Ages, has been often reprinted.

Jokai, *yo'kah e*, MAURUS (1825-1904), a famous Hungarian novelist. He produced his first novel, *Working Days*, in 1846, and it became immediately popular. He was prominent during the Revolution of 1848, and after it had been put down he was imprisoned. The entire revolutionary period and his own imprisonment and escape furnished the scene and plot for many later novels. Among Jokai's most important works are the novels, *The Two-Horned Man*, *The Hungarian Nabob*, *The Carpathian Sultan*, *The New Landlord* and *Black Diamonds*; the dramas, *King Koloman*, *The Martyrs of Szigetvar* and *Milton*, and a *History of Hungary*.

Jo'liba. See NIGER.

Jo'liet, ILL., the county-seat of Will co., 40 mi. s. w. of Chicago, on the Desplaines River, on the Illinois & Michigan Canal and on the Chicago & Alton, the Chicago, Rock Island & Pacific, the Atchison, Topeka & Santa Fé, the

Elgin, Joliet & Eastern and other railroads. A state penitentiary is located here, and the city has a public library, two hospitals, the Saint Francis and the Saint Mary academies, a township high school, a Masonic temple and a clubhouse for working men, built by the Illinois Steel Company. The industrial establishments are large steel, wire and tin plate works, stove factories, machine shops, implement works and other factories. A number of large limestone quarries are found in the vicinity. Joliet was settled about 1831 and was incorporated as a city in 1852. Population in 1900, 29,353.

Joliet, *zho lyay'*, LOUIS (1645-1700), a Canadian explorer, born in Quebec and educated for the priesthood. He was fond of adventure, however, and made several expeditions to the head of the Great Lakes. In 1672, with a Jesuit priest, Jacques Marquette, he was given command of an enterprise, the object of which was to trace the course of the Mississippi River. By his explorations it became certain that the Mississippi flowed into the Gulf of Mexico.

Jommelli, *yo mel'le*, NICOLÒ (1714-1774), a famous Italian musical composer, born near Naples and educated in that city. In 1754 he became *kapellmeister* to the duke of Württemberg; during his residence there the German ideals of musical composition greatly modified his natural Italian temperament, and upon his return to Naples he was coldly received. This doubtless hastened his death. His best operas, of which he wrote forty, were *Merope*, *Armida* and *Ifigenia in Aulide*. Among the other compositions, the oratorio *La Passione* and his *Miserere* are considered his masterpieces.

Jo'nah (dove), one of the minor prophets, son of Amittai, and according to *II Kings* xiv, 25, a contemporary of Jeroboam II, was born at Gath-Hepher, in Galilee. The book which bears his name is historical, rather than prophetic, and the miraculous event of Jonah remaining three days and three nights in the belly of the fish has been regarded by some as an allegory, a parable or a myth. Some theologians, however, are of the opinion that the mention of it by Christ (*Matt.* xii, 40) obliges us to regard the event as really historical. Jonah's grave is shown at Mosul, the ancient Nineveh, and also at Gath.

Jones, IN'IGO (1573-1652), an English architect, born in London, the reviver of classical architecture in England at the beginning of

the seventeenth century. He went to Venice, where the works of Palladio inspired him with a taste for architecture. Having returned to England, he became court architect under James I and Charles I. Among his best-known works are the Banqueting House at Whitehall, considered his masterpiece; Asburnham House; Covent Garden Piazza; Heriot's Hospital, Edinburgh, and Shaftesbury House.

Jones, JENKIN LLOYD (1843-), an American clergyman and lecturer, born in Cardiganshire, Wales. In his boyhood his parents came to this country, and he was educated at Meadville Theological School, in Pennsylvania. He was pastor of the Unitarian Church, Janesville, Wis., and in 1883 he became pastor of All Souls' Church, Chicago, an independent congregation which was later merged with other social, religious, educational and philanthropic enterprises in Abraham Lincoln Center, Chicago, a so-called institutional church of the broadest type. Since 1880 he has edited the religious journal *Unity*. He was chosen general secretary of the Congress of Religions in 1893. Among his works may be mentioned *A Chorus of Faith*, *The Seven Great Religions* and *Jess, Bits of Wayside Gospel*.

Jones, JOHN PAUL (1747-1792), a famous commander in the American naval service during the Revolution, was born in Kirkcudbrightshire, Scotland. In 1773 he emigrated to Virginia, and about that time he added to his real name, John Paul, the name of Jones, for what reason is not known. On the outbreak of the Revolutionary War he offered his services to the United States, and in 1775 he was given command of the flagship *Alfred*. For his excellent service on that vessel he was given in the following year the chief command of the *Providence*, and on this vessel he made several successful cruises, capturing a large number of prizes. With the *Alfred*, to which he was afterward returned, he also made many important captures. His removal from the *Alfred* was felt by Jones to be a great injustice and increased the resentment which he had hitherto felt against Congress because he was placed in rank below a number of naval captains who had not known as long and efficient service. In 1777, while in command of the *Ranger*, he set out on a European cruise, sailed along the coasts of England and by this daring invasion of British waters aroused great fear in the coast towns. In 1779, in command of the *Bon Homme Richard*, he threatened Leith and captured the

British sloop-of-war *Serapis*, after a bloody engagement off Flamborough Head. This was his greatest achievement, and high honors were shown him. On his return to America, however, he was somewhat neglected by Congress, and in 1788 he entered the Russian service with the rank of rear admiral. Owing to the jealousy of Russian commanders, he soon retired from the service and went to Paris, where he died. In 1905 a search was instituted for his remains, which were at length discovered, brought to the United States and buried at Annapolis, Md.

Jones, LEWIS HENRY (1844-), an American educator, born at Noblesville, Ind. He was educated at Oswego Normal School and De Pauw University. He began work as a teacher in the Indiana State Normal School and filled successively the positions of principal of the Indianapolis High School, principal of the Indianapolis Normal School, superintendent of Indianapolis schools, superintendent of Cleveland (Ohio) public schools, until 1902, when he was chosen president of the Michigan State Normal College at Ypsilanti. He is the author of the Jones series of readers and numerous reports and articles for educational reviews.

Jones, SAMUEL PORTER (1847-1906), an American clergyman and evangelist, popularly known as "Sam Jones," was born in Chambers County, Ala. At the age of twenty-two he was admitted to the bar in Georgia. After a somewhat dissipated career he professed religion and became a clergyman in the Methodist Episcopal Church South. After filling several pastorates he was agent for the North Georgia Orphanage, but spent a portion of his time in evangelistic work and in lecturing. He acquired a wide reputation, and many of his sermons and lectures were noted for their lack of conventionality. His works include *Sermons and Sayings by Sam Jones, Quit Your Meanness and Thunderbolts*.

Jon'quil, a bulbous plant, a species of narcissus, allied to the daffodil. It has long, lily-like leaves and spikes of yellow or white fragrant flowers. Perfumed waters are obtained from jonquil flowers. (See illustration on next page.)

Jon'son, BEN or BENJAMIN (1573?-1637), a celebrated English dramatist, the contemporary and friend of Shakespeare. He was born at Westminster and was placed in the Westminster or Grammar School at an early age, but was withdrawn, it is said, by his step-father, a master bricklayer, who wanted his assistance

in the business. He soon tired of this occupation, entered the army as a private soldier and showed much personal courage during a campaign in Holland. Returning to England, he began his career as an actor, and in 1598 his drama, *Every Man in His Humor*, was produced, Shakespeare playing a part in it. A duel, in which he killed his antagonist, led to Jonson's imprisonment, and after his release he was deprived of his possessions and branded on the thumb. In 1599 he brought out his comedy, *Every Man Out of His Humor*, which



JONQUILS

was followed by *Cynthia's Revels*; *The Poetaster*; *Sejanus*, a tragedy; *Volpone*; *Epicoene, or the Silent Woman*, his best work, and *Catiline*, a tragedy. In 1619, on the death of the poet laureate, Jonson was appointed his successor, and the salary was raised to the sum of \$500 by Charles I. Much of his time was spent at the Apollo, Mermaid and other taverns, feasting, drinking and engaging in those brilliant contests of wit in which in earlier days Shakespeare also had taken part. His latter days were spent, not perhaps in much prosperity, but certainly in fame and honor, as the acknowledged chief of English literature. He died of an attack of palsy, leaving behind him an unfinished pastoral poem of great beauty, *The Sad Shepherd*. He was buried in Westminster Abbey, where a

monument was erected to his memory with the inscription, "O rare Ben Jonson." Jonson's best dramas are excellent in plot and development, have strongly conceived characters and excellent traits of humor, but he is sometimes forced and unnatural and deals perhaps too much with passing manners and eccentricities. He had a genuine lyrical power, which is seen in his short poems and the songs interspersed in his masques.

Jop'lin, Mo., one of the county-seats of Jasper co., 68 mi. w. of Springfield on the Missouri Pacific, the Saint Louis & San Francisco and other railroads. The city is in the center of the zinc and lead fields of southwestern Missouri, which are the most important in the United States. There are extensive smelting works, white lead and paint factories and large foundries, machine shops and flouring mills. A valuable trade from a large agricultural district centers here. The especially notable structures are the courthouse, the Federal building, the Carnegie library, the opera house, several hotels and the Y. M. C. A. building. Joplin was settled in 1870 and was incorporated three years later. Population in 1900, 26,023.

Jop'pa. See JAFFA.

Jordaens, *yor'dahns*, JACOB (1593-1678), a leading Flemish painter, noted for the masterly realism shown in his portraits, historical paintings and home scenes. There are a great many of his works in the principal European galleries. His *Admiral Ruyter*, in the Louvre; his *Christ Driving the Money Lenders from the Temple*, in the Louvre, and *The Bean Feast*, in Vienna, are typical of the three classes of paintings which he executed.

Jor'dan, the most important river of Palestine. It rises in the northern part and is formed by the union of several small streams, which have their sources in the mountains. The river flows southward through Lake Huleh, or the biblical Merom, the Lake of Tiberias, or Sea of Galilee, and enters the northern end of the Dead Sea. The distance between its source and its mouth in a straight line is about 65 miles, but owing to its winding course the length of the river is 200 miles. The Jordan is a very rapid stream and descends during its course from an altitude of about 700 feet above sea level to that of 1300 feet below sea level. Between Lake Huleh and the Sea of Galilee the river falls 69 feet to the mile, and below the Sea of Galilee its average fall is 9 feet to the mile. Where it enters Lake Huleh it is about 100 feet wide;

between the Sea of Galilee and its mouth it varies in width from 90 to 250 feet, and at its mouth it is 540 feet wide. Its usual depth below the Sea of Galilee is from 2 to 3 feet, but occasional depressions in the river bed cause pools of greater depth. Except during the period of flood, the river is navigable in many places. It is also crossed by a bridge at a point a little below Lake Huleh and another below Lake Tiberias.

The Jordan flows through a remarkable valley, which consists of a smaller valley within a large one. The great valley, called the Ghor, varies in width from 1 to 16 miles and is bounded by precipitous ridges, which in places attain a height of from 3000 to 4000 feet. The small valley, called the Zor, which is the real valley through which the river flows, is narrower, varying from $\frac{1}{2}$ mile to 2 miles in width, and in many places is bounded by steep sides. During the rainy season the valley of the Jordan is covered with grass; and trees, such as the tamarisk, the acacia, the oleander and other trees, flourish. The Jordan is of unusual historical interest, because of the events connected with the life of Christ and the Chosen People, which occurred along its banks and in the immediate vicinity. See PALESTINE.

Jordan, DAVID STARR (1851-), an American educator. He was born in Gainesville, N. Y., and attended Cornell University, where he became instructor in botany in 1870. Two years later he was professor of botany and biology in Lombard University, Galesburg, Ill., and at this time he began the study of fishes under the instruction of Agassiz. From 1875 to 1879 he was a professor in biology at Butler University, Indianapolis, Ind., and later, in 1885, after having served as professor of zoölogy at the University of Indiana, he was made president of that institution. For many years Jordan was connected with the United States Fish Commission and made many valuable researches and investigations. In 1891 he was made president of the Leland Stanford Junior University, where his work has been very successful. In addition to many reports and papers prepared for the Fish Commission, he has written various books, including a *Manual of Vertebrate Animals of the Northern United States*, *Science Sketches*, *Fishes of Northern and Middle America* and *Imperial Democracy*.

Jorullo, *ho roo'lyo*, a volcano of Mexico, in the Department of Michoacan. Its origin dates from 1759, when it was formed as the result of

an earthquake. Its height is 4265 feet, and it is now dormant.

Joseph, *jō'sej*, one of the two sons of the patriarch Jacob by his favorite wife, Rachel. His father's preference for him aroused the jealousy of his elder brothers, who sold him to some Ishmaelitic slave dealers, by whom he was sold to Potiphar, a distinguished officer in Egypt. The story of his elevation to the position of vice-regent of Egypt, and the settlement of his father and brothers there is well known (*Gen.* XXXVII, XXXIX-XLVIII). Authorities still differ as to the period in Egyptian history to which Joseph's life belongs, some placing it before, others under, and others after the time of the Hyksos, or shepherd kings.

Joseph, the husband of Mary, the mother of Jesus, was a descendant of the House of David, though resident at Nazareth, where he followed the trade of a carpenter. Early tradition repre-



DAVID STARR JORDAN

sents him as an old man at the time of his marriage, and he seems to have died before the commencement of the public ministry of Jesus. His day in the Roman Catholic calendar is March 19.

Joseph II (1741-1790), Holy Roman emperor, son of Francis I and Maria Theresa. He was elected king of the Romans in 1764, and on the death of his father in the following year he became German emperor, succeeding his mother, however, in the hereditary estates of the house

Josephine

of Austria only in 1780. He at once commenced an extensive scheme of reforms, but the country was not prepared for such sudden changes, and he was compelled to give up most of his plans. Religious freedom was allowed throughout his dominions. In 1788 he made war against Turkey, which resulted unfavorably for Austria.

Josephine, *zho za jeen'*, MARIE ROSE (1763-1814), empress of the French, wife of Napoleon Bonaparte. She was married to the Vicomte de Beauharnais, by whom she had two children, Eugène and Hortense. In 1794 her husband, who had been commander of the army of the Rhine, was executed by order of the Convention. After the fall of Robespierre she paid a visit to Napoleon to thank him for restoring the sword of her husband, and she so pleased him that he soon after married her (1796). She became a beneficial element in his life, and her amiable manners won the hearts of everybody and helped to secure her husband's position. When Napoleon ascended the throne in 1804 she was crowned along with him. But the fact that the union was childless stood in the way of Napoleon's ambition to become the founder of a dynasty, and in 1809 Josephine was divorced. She retained the title of empress, and was allowed a large annual grant.

Joseph of Arimathaea, a member of the Jewish sanhedrin, who, though a believer in Jesus, had not the courage to make open profession of his faith. Nevertheless, after the crucifixion he went to Pilate, begged the body of Jesus and with Nicodemus buried it in his own garden.

Josephus, *jo see' fus*, FLAVIUS (37-?), a Jewish historian. In 64 A. D. he made a journey to Rome, and on his return he found his countrymen preparing to throw off the Roman yoke. Having tried in vain to persuade them of the hopelessness of such a struggle, he accepted the post of defending the Province of Galilee and actually held the fortified town of Jotapata against the whole Roman army for forty-seven days. He was captured at the fall of the city, was afterward present in the Roman army at the destruction of Jerusalem (70 A. D.) and went with Titus to Rome, where, assuming the family name of his patron, Flavius, he lived in learned leisure. Here he wrote (in Greek) *The History of the Jewish War*; *Jewish Antiquities*, giving a history of the Jews from the earliest times to the reign of Nero, and an *Autobiography*, mostly relating to the time of his military activity. The

Joubert

date of his death is uncertain. It is known that he saw the end of the century.

Josh Bil'lings. See SHAW, HENRY WHEELER.

Josh'ua, the successor of Moses in the command of the Israelites, the son of Nun, of the tribe of Ephraim. He was nominated by Moses to succeed him in the command of the army of Israel, led the Israelites over the Jordan and in the course of seven years conquered the greater part of Palestine and divided the country among the tribes. He died at Timnath-Serah, in Mount Ephraim, at the age of 110. His history is contained in the book which bears his name and of which he is usually regarded as the author.

Josi'ah, king of Judah, succeeded his father Amon at the age of eight years (639 B. C.). He took an active part in the reform of public worship and commenced the restoration of the temple, during the progress of which the high priest Hilkiah discovered the book of the law, thought by some to be substantially the same as the book of *Deuteronomy*. The prescriptions it contained gave a decided direction to the reform movement, which the king conducted with great vigor. In his thirty-first year, prompted probably by friendship for the king of Assyria, he marched out against Pharaoh Necho, who was on his way to attack that kingdom. The two armies met at Megiddo, where Josiah was slain.

Jotuns, *yo'toonz*, in northern mythology, immense giants and magicians, who had command over the powers of nature and lived in dark caves in their kingdom of Jotunheim, from which they waged perpetual war against the gods. Originally they represented the destructive forces in nature. They were cunning, malignant, versed in witchcraft, but not highly intelligent.

Joubert, *zhoo bair'*, PIETRUS JACOBUS (1831-1900), a Boer general and statesman, born in Cape Colony, of Dutch Huguenot parents. He moved to the South African Republic and engaged successfully in farming and cattle raising. He was elected to the legislative assembly of the Republic and became attorney-general. In the campaign against the British in 1880 and 1881, Joubert was commander general of the Boer forces and won fame for his military ability. Several times he acted as president of the Republic in the absence of that official, and throughout his career he was in favor of a liberal policy toward the English residents of the country. In the great contest of 1899-1900 he proved himself to be one of the

ablest generals on either side. Early in 1900 his health failed, and he retired to Pretoria, where he soon afterward died.

Jourdan, *zhoor dahn'*, JEAN BAPTISTE, Count (1762-1833), marshal of France. He fought in the American Revolutionary War, under d'Estaing, and on the outbreak of the French Revolution he was made a captain of the National Guard at Limoges. Later he was chief of battalion, brigadier general, general of division and, finally, commander in chief of the army of the north. He won several victories over the Austrians during 1793 and 1794, but during the two years that followed, he was less successful and consequently resigned his command. In 1799 he was placed in command of the army of the Danube, but was removed from command after a defeat by the Austrians. Napoleon made him governor of Piedmont in 1800, and later he became chief of staff to Joseph Bonaparte. He was in favor under Louis XVIII, but took part in the Revolution of 1830, after which he held for a short time the office of minister of foreign affairs.

Journalism, *jur'nal iz'm*. See NEWSPAPER.

Journalism, SCHOOL OF, a college of Columbia University, founded in 1903 by Joseph Pulitzer of the New York *World*. The school has an endowment of \$2,000,000. It is the purpose of this school so to train men in journalism as to make the newspaper profession one of higher character and standing, and to increase its power and prestige through the better equipment of those who follow it. The course of study will include the ethics and law of journalism besides a serviceable course in general ethics and practical law, rhetoric and composition, with especial regard to the requirements of newspaper work; advanced courses in literature, United States history, contemporary European history, economics, sociology and political science.

Other universities in the east and in the central west have organized courses in training for journalism along about the same lines as that of Columbia, though with somewhat less elaborateness.

Juan Fernandez, *hwahn fer nahn'dath*, known, also, as Mas-a-Tierra, a group of small islands in the South Pacific Ocean, about 400 mi. off the coast of Chile, to which the group belongs. They are of volcanic origin and reach in some parts a height of 6000 feet. Parts are fertile, producing various kinds of timber, peaches, figs, grapes and cherries. The islands are occupied by some hundreds of settlers, whose

chief occupation is cattle raising. De Foe is said to have founded his *Robinson Crusoe* on the history of the solitary residence here for over four years (1704-1709) of a Scotch sailor, Alexander Selkirk. The islands were discovered in 1574 by Juan Fernandez.

Juarez, *hwah'res*, BENITO PABLO (1806-1872), president of the Mexican Republic. He was born of pure indian parentage, received a good education, was admitted to the bar and after holding various important public offices, was elected president in 1861. As the Mexican government at his accession was bankrupt, he declared the suspension of payments on the foreign debt for two years, a step which occasioned the interference of Britain, Spain and France. Troops were landed in Mexico in 1862, but Britain and Spain soon retired, leaving Napoleon III to carry out his plans alone. Maximilian of Austria came, on Napoleon's invitation, to assume the throne, but Juarez, in spite of defeats and losses, continued to head a resistance, and when Napoleon under pressure from the American government withdrew his troops in 1866, the republicans carried all before them. Maximilian was captured and shot, and Juarez was reelected to the presidency (1867), which he held till he died. See MAXIMILIAN; MEXICO, subhead *History*.

Ju'bilee, a festival of the Jews, held every fiftieth year. During this year all slaves or captives were to be released; all estates which had been sold reverted to their original proprietors or their descendants, unless it were a house in a walled city, and the ground was to lie fallow. It has been doubted whether the law of jubilee was ever actually observed until the return from Babylonian exile, when, for a time at least, it came into operation.

Ju'dah, the fourth son of the patriarch Jacob by his wife Leah, the forefather of one of the twelve tribes.

Ju'das, surnamed *Iscariot*, meaning, perhaps, the man of Kerioth, a village of Judea, was one of the twelve apostles of Jesus and betrayed his Master into the hands of the Jewish priests for thirty pieces of silver. Remorse for his crime led him to suicide.

Judas or **Jude**, brother of James, one of the twelve apostles. Matthew and Mark call him Thaddeus, surnamed Lebbaeus. Nothing is known of his life. By many he is considered the author of the *Epistle of Jude*.

Judas Tree, a name given to a number of trees of the same genus and belonging to the

same family as the locust. The name originated in the tradition that Judas hanged himself on one of these trees, which grow wild throughout the Orient, in southern Europe and in tropical America. One species, called the *red bud*, is common in the warmer parts of the United States. This has pointed leaves and produces numerous clusters of bright red flowers in early spring, before the leaves appear on the branches. The buds of most species are esteemed as a delicacy.

Judd, ORANGE (1822-1892), an American farmer and journalist, born near Niagara Falls, N. Y. He graduated at Wesleyan University and soon after began the publication of the *American Agriculturist*. In 1883 he founded the *Prairie Farmer* and in 1888 the *Orange Judd Farmer*, which is still published. Through his influence much legislation in the interest of the agricultural classes was passed by Congress and by state legislatures.

Jude, one of the books of the New Testament. Its acceptance by the early Church was delayed until, like the writings of the evangelists, its divine inspiration was undoubted. In it the apostle denounces the heresies of the Simonians, the Nicolaites and the Gnostics and appeals to the members of the Christian Church to adhere faithfully to its teachings. Jude's epistle was written in Palestine about 62 A. D.

Jude'a, a term applied, after the return of the Jews from exile, to that part of Palestine bounded on the east by the Jordan and the Dead Sea, on the north by Samaria, on the west by the Mediterranean and on the south by Arabia Petraea. See PALESTINE.

Judge, *juj*, a person duly invested with authority to determine questions between parties according to law. The term is quite a general one, being applicable to any one appointed to sit in a court of law and try cases; but certain judges are designated by particular titles, as *justice* and *lord-justice*. The judge at common law decides points of law and enables the jury rightly to decide questions of fact, while in equity he decides both classes of questions. A judge cannot be prosecuted for the consequences of his decisions, except in the case where he may have acted without jurisdiction, nor can he officiate in a case where he has a personal interest, unless it be merely his common interest as a citizen. See LAW; COURTS; PROCEDURE.

Judges, BOOK OF, one of the books of the Old Testament, so called because the greater part of the narrative is occupied with the history of the judges who were raised up to deliver their

countrymen from the oppression of their neighbors.

Judgment, in law, the judicial determination and decision of a court in an action. It is either *interlocutory* or *final*. In the former case it is given only on some particular point or proceeding; upon the final judgment execution may follow, unless it be appealed against, suspended or recalled. See PROCEDURE.

Judgment, in psychology, the process of comparing two concepts and deciding that they agree or disagree. The formation of a judgment is the second step in thinking (See THOUGHT). It is more difficult than the formation of concepts, because in the formation of judgments two concepts must be held in mind, while in the formation of a concept, we group together the qualities belonging to the object before us and decide that these qualities also characterize the class to which these objects belong. In forming the concept of gold, for instance, from observation we obtain the idea of color, hardness, weight and malleability, all from the object under consideration. But in forming a judgment we hold in mind two distinct ideas, both of which are abstract, and from our comparison we decide that they agree or disagree. Judgment combines concepts and unites knowledge and makes it more valuable. Correct judgments can be formed only from accurate concepts and by following the laws of thought. See CONCEPT; REASON.

Judiciary, *ju dish'e a ry*. See COURTS.

Ju'dith, widow of Manasses, a Jewish heroine, whose history is given in the apocryphal book which bears her name. According to this book, Judith went to the tent of Holofernes, an Assyrian general who was besieging Bethulia, the city in which she lived, and charmed him with her beauty. A banquet was served in her honor, and after it, while Holofernes lay in drunken sleep, Judith cut off his head.

Jud'son, ADONIRAM (1788-1850), an American missionary, born in Malden, Mass. He was a graduate of Brown University and of Andover Theological Seminary, and in 1812 sailed for India with his bride. They settled in Rangoon and joined the Baptists. Judson translated the New Testament into Burmese, 1817-1821, completed the Bible translation in 1833 and later made a Burmese-English dictionary. During the Burmese war Judson was imprisoned. His wife, author of *History of the Burmese Mission*, died in 1826. His second wife, widow of G. D. Boardman, died on a voyage to America in

1845. His third wife wrote under the pen name *Fanny Forester*. Judson died at sea on his way to Mauritius.

Jug'gernaut or **Jagannatha** (lord of the world), the name given to the Indian god Krishna and to a very celebrated idol of this deity in a temple specially dedicated to Jagannātha at Puri, on the Bay of Bengal. The idol is a rudely cut wooden image, with a red body, black face and gilt arms; the mouth is open and blood-red; the eyes are formed of precious stones. It is covered with magnificent vestments and is seated upon a throne between two others—his brother Bala-Rama and his sister Subhadra, colored respectively white and black. Great numbers of pilgrims, sometimes a hundred thousand, at the time of the festivals of Jagannātha, assemble from all quarters of India to pay their devotions at this shrine. On these occasions the idol is mounted on a huge car resting on sixteen wheels and is drawn by the pilgrims to his summer home. The task requires several days, on account of the great weight of the car and the sandy condition of the roads, and the pilgrims, becoming exhausted, usually secure professional car haulers to complete the task. There is no truth in the popular belief that the devotees prostrate themselves before the car to be crushed.

Ju'gular Vein, one of the large trunks by which the greater part of the blood that has circulated in the head, face and neck is returned to the heart. There are two jugular veins on each side, an external, or superficial, one, lying just underneath the skin, and an internal, or deeper, one, near the carotid artery.

Jugur'tha (?-104 B. C.), a king of Numidia, the grandson of Masinissa. He was brought up at the court of his uncle, the king of Numidia, and after his uncle's death he succeeded in wresting the kingdom from his cousins. When, at the solicitation of the deposed princes, Roman armies were sent against Jugurtha, he bribed the generals and for many years exercised his power unchecked. Q. Caecilius Metellus, who was sent against him in 109 B. C., finally defeated him and compelled him to flee from the country. Marius further prosecuted the war and in 104 B. C. took Jugurtha a captive to Rome.

Ju'jube, the popular name of a genus of spiny shrubs or small trees. There are numerous species, several of which bear a blood-red or saffron-colored fruit, which is wholesome and pleasant to eat. The fruit of the common jujube, which has been introduced from Syria

into Europe, resembles an olive in size and shape. The jujube paste, which is used as a confection, is no longer made from the jujube fruit, but is prepared from gum arabic with sugar and the whites of eggs. Tradition says that the crown of thorns which was placed on the head of Christ was made from the spines of the jujube.

Ju'lep, in medicine, a solution of sugar in aromatic water, not so concentrated as syrup. In the United States the name is given to a drink, composed of brandy or whisky, sugar, pounded ice and a seasoning of mint. It is also called mint julep.

Ju'lian, in full, Claudius Julianus, called *The Apostate*, (331-363), Roman emperor. He was brought up in the Christian religion, studied philosophy and letters and resided in Athens, where he was induced to accept paganism. Having received command of an army against the Alemanni, he defeated them at Strassburg and drove them beyond the Rhine. He also displayed great talent as an administrator in Gaul. The emperor now became jealous of Julian and recalled his best troops, under pretense that he wanted to employ them against the Persians. This order caused a rebellion among the soldiers, who proclaimed Julian emperor in 360, in spite of his own resistance. Constantius prepared to proceed against him, but soon after died, and Julian was generally recognized as emperor. He sought to restore the heathen worship in all its splendor, and on that account he opposed Christianity as much as was in his power, without, however, persecuting the Christians themselves. In 363 he headed an expedition against the Persians and took several cities, but was mortally wounded in a battle.

Julian, GEORGE WASHINGTON (1817-1899), an American political leader, born in Centerville, Ind. After an academic education he was admitted to the bar in 1840 and immediately entered politics. He served in the state legislature, was prominent in the free soil movement in 1848 and was elected to Congress in the following year. In the succeeding presidential election (1852) he was candidate for vice-president on the Free-Soil ticket with John P. Hale. At the organization of the Republican party he joined the movement and was a conspicuous adherent of the party for many years. From 1860 to 1870 he held a seat in Congress, but two years later he joined the Liberal Republican movement and from that time acted with the

Democrats. His last public office was surveyor-general of public lands in New Mexico, an appointment which he received from President Cleveland.

Julian Calendar. See CALENDAR; EPOCH.

Ju'lius, the name of three popes. **JULIUS I** reigned from 337 to 352 and was noted for the assistance that he gave to the bishops in their opposition to the son of Constantine. He is considered a saint, and his day is observed on April 12. **JULIUS II** reigned from 1503 to 1513. He gave his attention chiefly to the political and military movements that resulted in a complete restoration of papal sovereignty and the extinction of foreign rule in Italy. In 1508 he entered into the League of Cambrai with Louis XII, the emperor Maximilian and Ferdinand of Aragon, but when the purposes of this league had been attained he withdrew and joined the Holy League, thus forming an alliance in opposition to the league that he first joined. The Holy League secured a controlling influence in France, northern Italy, Bologna, Reggio and some smaller Italian states and secured these to the papal government. Before the papal power could be further extended, however, Julius died. **JULIUS III** was pope from 1550 to 1555. He was one of the three legates appointed to preside over the Council of Trent, which he reopened as pope in 1551.

Jul'lundur. See JALANDHAR.

July, the seventh month in our calendar, having 31 days. In the Roman year it bore the name of *Quintilis*, as originally it was the fifth month. Its change of name to *Julius* was in honor of Julius Caesar, who was born on the 12th of the month.

July, **COLUMN OF**, a bronze column in Paris in the Place de la Bastille, in commemoration of the citizens who fought for the liberty of France, July 27, 28 and 29, 1830. The column bears the names of the 615 who fell in the revolution, and in the vaults below are the bodies of these victims and also those of the Revolution of 1848.

July Revolution, the name given to the revolution in France in 1830 which placed Louis Philippe on the throne and drove out the restored House of Bourbon. The reactionary policy of Louis XVIII and Charles X had made the Bourbon dynasty exceedingly unpopular, and when, in July, 1830, edicts interfering with the liberty of the press and with the franchise privileges were issued, matters came to a climax at once. The July Revolution in France extended

little beyond Paris, but its influence was wide and affected seriously other European countries.

Jumping Bean, a name given to the seeds of a number of different plants of the spurge family, because the seeds when laid upon a level surface will move about by jerks and jumps. The motion is caused by a larva or small grub which lives in the seed until ready for its transformation into a moth. The plants and insects are found in Central and South America. *Bronco beans* is a local name for the seeds.

Jumping Mouse. See DEER MOUSE.

Jun'co, the popular name of several species of dark slaty or ash-colored birds which show more or less white below and have white bills. All are small finches, and the slate-colored junco is seen in large numbers among the earliest of the spring migrants in the northern United States east of the Rocky Mountains.

Junction City, KAN., the county-seat of Geary co., 135 mi. w. of Kansas City, at the junction of the Republican and Smoky Hill rivers and on the Union Pacific and the Missouri, Kansas & Texas railroads. The city has extensive limestone quarries and is an important shipping point for grain, live stock and other farm produce. Fort Riley, a large army post, is three miles east of the city. The waterworks are owned and operated by the municipality. Population in 1905, 5264.

June, the sixth month in our calendar. It consisted originally of twenty-six days, to which it is said Romulus added four, and from which Numa took away one. Julius Caesar again lengthened it to thirty days, and it has ever since remained unaltered.

Juneau, joo no', the capital of Alaska, situated on Gastineau Channel, 110 mi. s. of Skagway and 160 mi. n. w. of Sitka. It is in the center of a mining district and is near the Treadwell gold mines on Douglass Island and the Silver Bow mines. It is the largest town in that part of Alaska, has banks, an electric light plant and newspapers and is connected directly with Seattle, San Francisco and other Pacific towns by steamer. Other lines also give it communication with Sitka, Nome and Skagway. It is an important point for miners' supplies and was made the capital of the territory in 1906. Population in 1900, 1864.

Juneau, LAURENT SOLOMON (1793-1856), an American pioneer, founder of Milwaukee, Wis., born in Canada. He became an indian trader and soon went to Wisconsin, settling first at Green Bay and then at the site of Milwaukee.

Obtaining possession of a large tract of land ceded by the indians, he began the erection of a village and became first postmaster and president. He was also first mayor of the city. He lost most of his property, which at one time was immensely valuable, and died in comparative poverty.

June'berry, a North American wild tree common in Canada and the United States, allied to the medlar. The fruit is pear shaped, about the size of a large pea, purplish in color, and it is a good article of food. *Service Berry* and *shad bush* are other names.

June Bug or **May Beetle**, a common clumsy beetle that buzzes around the lights in summer evenings, frequently bumping into walls and falling to the ground. When numerous, the larvae, which are fat, white grubs, are injurious to lawns and meadows.

Jungfrau, *yoong'frow*, (maiden), a mountain of Switzerland, in the Bernese Alps, on the frontiers between the cantons of Bern and Valais, 12 mi. s. s. e. of Interlaken. It is one of the most magnificent mountains in Switzerland and is 13,670 feet high. It was first ascended in 1808, and since that time the ascent has often been made. An electric railway ascending the mountain was opened in 1903. A striking feature of the route is a tunnel over six miles in length.

Jungle, *jun'g'l*, properly, an Indian term applied to a desert and uncultivated region, whether covered with wood and dense vegetation, or not; but in English it is applied to land covered with forest trees, thick, impenetrable brushwood or any coarse, rank vegetation. The densest jungles occur in the tropical regions.

Jungle Fever, a severe variety of remittent fever, occurring in the East Indies and other tropical regions. Cold and hot stages alternate, the fever usually appearing at night and disappearing in the morning.

Jungle Fowl, one of a genus of birds of which four species are known, living in the East Indies and northern India. The most common species is much like our domestic fowls, and it is believed that the barnyard poultry have descended from these birds.

Juniper, a genus of evergreen shrubs and trees of the cone-bearing family, growing in both Europe and the United States. About twenty species are known. The common juniper is a straggling bush which bears bluish-black berries, that require two years to mature. In Holland they are used extensively in the prepa-

ration of gin, and from them an important medicinal oil is prepared. One species of juniper furnishes the common red cedar of North America, a wood valuable to cabinetmakers and in the manufacture of pencils.

Ju'nius Letters, **THE**, certain letters on public affairs which first appeared in the *Public Advertiser*, a London paper published by Henry S. Woodfall, from which they were copied into most of the other journals of the time. The earliest bears the date Jan. 21, 1769; the last, Jan. 21, 1772. After they were completed they were collected and published by Woodfall, with a dedication to the English nation and a preface by the author. Although so long a time has elapsed since the publication of these papers, their authorship seems as far from being settled as ever. It was evident from the first that the author was fully acquainted with British politics, with the proceedings of both houses of Parliament and with the characters of all the leading statesmen. To this wide information he united a boldness, vehemence and rancor which, combined with his epigrammatic and unsparing invective, rendered him an object of terror to those whom he attacked. Public suspicion at the time was fixed most strongly on Burke and Viscount Sackville. But Burke denied the authorship to Dr. Johnson, and on several points Burke and Junius were in direct opposition to each other. That Viscount Sackville was the author received considerable belief for some time. But it is now generally believed that Sir Philip Francis was Junius, although all the evidence is but circumstantial.

Junk, a flat-bottomed ship used in the waters of China and Japan, sometimes reaching 1000 tons. It has a high forecastle and poop and ordinarily three masts of considerable height, each mast being made in one piece, with a lug-sail, generally of bamboo splits. The bow is bluff, the stern is full and the rudder is very large.

Juno, called *Hera* by the Greeks, was, in classical mythology, queen of the gods, sister and wife of Jupiter. The life of Jupiter with his queen was not represented by poets as an exceedingly happy one, for Jupiter was an unfaithful husband, and Juno was a very jealous and exacting wife. Much of her time, therefore, was of necessity spent in devising punishments for Jupiter's mortal wives or their sons. She was represented as a beautiful woman of matronly aspect, attended by the nymphs and the hours and, particularly, by Iris. The goose, the

cuckoo and the peacock were sacred to her. As the special protectress of all that concerned marriage or the birth of children she was particularly worshiped by women.

Junot, *zhu no'*, ANDOCHE, Duke of Abrantès (1771-1813), a French marshal. He was made aid-de-camp to Napoleon in the Italian and Egyptian campaigns, and on his return from Egypt in 1800 he was made commandant of Paris. As he did not fill that position satisfactorily, he was sent in 1805 as ambassador to Lisbon. Leaving that post, he joined the army in Germany and distinguished himself at Austerlitz. While in a campaign in Portugal in 1807 he rendered such good service that he was made duke of Abrantès as a reward, but in 1808, after a defeat by Wellington, he made an unfavorable treaty with the English and as a result fell into disfavor with Napoleon. In 1812 he was made governor of Illyria, but it became plain at this time that as a result of a wound in the head, which he had received in the early Italian campaign, he was mentally deranged. He was brought back to Montbard in 1813 and there committed suicide.

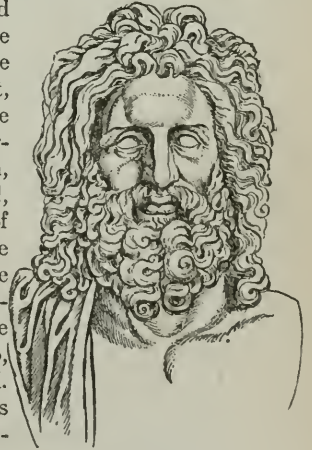
Jun'ta (Spanish, "an assembly"), in Spain and Spanish-American countries, a council of state. It was originally applied to an irregularly summoned assembly, as distinguished from the Cortes, or parliament, regularly called together by the authority of the king; but the name is now applied to legal bodies.

Jup'iter, the fifth planet from the sun, the largest planet of the solar system and, excepting the sun, the largest body. It is more than three times as large as all the other planets put together, and yet it is not more than 1/1000 part as large as the sun. The mean diameter of Jupiter is about 85,000 miles, and the mean distance from the sun over 475,000,000 miles. Jupiter rotates on its axis in 10 hours and is accompanied by seven moons. Until 1892 but four were known. Then the fifth satellite was discovered by Prof. E. E. Barnard, then of the Lick Observatory. A sixth was discovered at the same institution by C. D. Perrine in 1904, and a seventh by the same astronomer in 1905. As the inclination of Jupiter's axis is very small, changes in season must be almost unknown. Jupiter is recognized by the naked eye as, next to Venus, the brightest of the planets, and during January, 1908, February, 1909, and so on for several years, a month later each year, is the brilliant evening star. Jupiter and its satellites, making a miniature solar system, have always been studied with

great interest by astronomers. Its surface shows belts of dark and light shade, which are usually, but not always, parallel to each other and undergo quick changes, seeming to merge one into another. These are thought to be masses of clouds, swept about by air currents in an atmosphere much heavier than ours. The moons appear from the earth to move in nearly straight lines from one side of the planet to the other, so that the planes of their orbits are nearly the same as those of Jupiter. They are eclipsed in the shadow of the planet, and their own shadows may be seen passing over the planet's surface. It was by observation of the eclipses of the satellites of Jupiter that Römer discovered that light does not travel instantaneously and computed its velocity. Through a telescope, Jupiter appears like a sphere more flattened at the poles and more bulging at the equator than our earth. It is probable that Jupiter is not a solid body, like Venus and Mars, but is still in a heated and probably partially gaseous state, resembling the sun except that the light given off is small.

Jupiter or **Jove**, the greatest of the Roman gods, called Zeus by the Greeks. He was the son of Saturn and

Rhea, and in the division of the world by lot, which took place after the overthrow of Saturn, Jupiter received, as his share of the universe, the heavens and the earth, while Neptune received the sea, and Pluto, the lower world. His first wife was Metis, the goddess of wisdom, whom, to prevent



JUPITER
Zeus Otricoli, Vatican, Rome

a prophecy that his first child should be wiser than himself, he swallowed. Shortly after, however, Minerva sprang full armed from his head. Juno was the chief wife of Jupiter, but he was by no means always faithful to her and was constantly pursued by her jealousy. Besides the goddesses Themis, Ceres, Mnemosyne and Latona, he had many mortal wives, among them Alemene and Antiope, Danae, Europa, Leda and Io. Among his children were the Fates, the Graces, the Muses, Apollo and Diana, Mars and Hebe

and many of the famous Greek heroes. Jupiter was represented in art as a man of middle age and dignified appearance, usually seated on a throne and bearing in his hands his spear and thunderbolts. He was usually accompanied by an eagle, his sacred bird.

Jura, *zhu ra'*, a chain of mountains in central Europe, which covers parts of France, Switzerland and Germany. The main Jura is made up of a series of parallel ranges, with a length of 180 miles, in the form of a curve, and a breadth of 30 miles. The principal geological formation is the Jura limestone, with green sand, belonging to the lower cretaceous series. Stalactite caves are numerous, and fine forests are on the summits. The two chief rivers which have their source in the chain are both French—the Ain and the Doubs. They descend from its western slopes and belong to the basin of the Rhone. Its highest points are Crêt de la Neige, 5680 feet; Reculet, Dôle and Mont Tendre.

Juras'ic System, a system of rocks lying between the Triassic, below, and the Cretaceous, above, and named from the Jura Mountains in Switzerland, where the formations are especially prominent. The Jurassic is the middle system of the Mesozoic era. The formations are prominent in Europe, but in the United States they are comparatively unimportant. In California and Oregon they constitute some of the gold-bearing rocks, but are so closely related to those of the Triassic that it is impossible in many instances to tell to which system the formations belong. See TRIASSIC SYSTEM; MESOZOIC ERA; CRETACEOUS SYSTEM.

Jurua, *zhoo roo a'*, a river of South America, the most westerly of the large southern tributaries of the Amazon. It rises in the Andes Mountains in Peru and flows in a northeasterly direction. Its length is somewhat over 700 miles.

Jury and Trial by Jury. The history of trial by jury is not traceable to its origin. It probably began among northern European races, the first known form being found among the Anglo-Saxons, where an accused person could summon twelve neighbors to swear to his innocence.

To-day in criminal trials two juries act, the *grand jury* and the *petit jury*. The former may consist of any number more than eleven and less than twenty-four men, whose names are drawn by lot from a list of eligible men and who are summoned by the sheriff of the county. Their names are returned on a piece of parchment, which is called a *panel*. After the oath has been admin-

istered they proceed to consider in private the charge, or *indictment*, which is brought against the accused. If twelve members agree that the accusation has a basis of truth they return a *true bill*. If they find that the accusation is unfounded they *ignore* the bill, and the accused is dismissed. Petit juries consist of twelve persons and are required in the trial of all criminal offenses and of all issues of fact in civil cases under the common law.

The petit jurors are chosen in the same manner as the grand jurors, but the attorney for either the defendant or the plaintiff in any suit has the right to challenge the right of any one to sit upon the jury for reasons either of prejudice or ignorance, or for other good cause. When once accepted, no juror is at liberty to leave his post without the court's permission. When a prisoner is charged with treason or felony the jurymen are usually allowed to retire only in custody of the sheriff or his deputies, who are sworn to keep them together and not to speak to them with reference to the case. When the evidence has been given, the presiding judge instructs the jury in the points of law which apply to it, leaving the jury to deal with the facts, and their decision is considered final. In considering the evidence they withdraw to a private room, and until reaching an agreement, or until it becomes evident that they cannot reach an agreement, no communication is permitted with other persons, even food and other necessities being supplied by officers of the court. If the twelve jurors fail to agree they are discharged by the judge, and the case can be tried anew before a new jury. An appeal can be taken from any verdict to a higher court upon showing some legal error in the conduct of the case, or upon the presentation of new important evidence.

The so-called *coroner's jury* is summoned to inquire into cases of sudden or violent death. This jury varies in size from six to twenty-three members. If any persons are found guilty of crime in connection with the death they are reserved for trial before a petit jury. See LAW; COURTS; PROCEDURE.

Justice, DEPARTMENT OF, one of the executive departments of the government of the United States. Though the office of attorney-general was organized in 1789, this official did not become a member of the president's cabinet until 1870. He is fourth in line of succession to the presidency. The department has charge of all legal business of the government, the attorney-general being the chief law officer.

Justice of the Peace

It is his duty to advise the president and the secretaries of the departments in all legal matters, to represent the government in court, to direct the district marshals and attorneys of the government, to supervise the penal and reformatory institutions, to administer the national bankruptcy law and, when required, to revise and codify the Federal laws. See UNITED STATES, subhead *Government*.

Justice of the Peace, a judicial magistrate intrusted with the conservation of the peace. In the United States the office is held either by appointment or election, and the incumbent has judicial power in certain petty civil and criminal cases. He can examine offenders and hold them to upper courts for trial. In some states he has a right to celebrate marriages. In Great Britain the justice is practically appointed by the lord chancellor and has certain executive as well as judicial functions.

Justification, a theological term employed to designate the act by which a person is accounted just or righteous in the sight of God or placed in a state of salvation. This conception of God as a judge who absolves the sinner on account of Christ's merit and imputed righteousness, is based upon the writings of Saint Paul and received its most pronounced expression at or immediately after the Reformation.

Justinian I, in full, Flavius Anicius Justinianus, called *the Great*, (483-565), emperor of the East, was born of an obscure family. On the death of his uncle, the emperor Justin, with whom he had latterly shared the imperial power, he was proclaimed emperor. Aided by his generals Belisarius and Narses, he was able to restore to the Roman Empire a part of its former possessions, by victories over the Persians, victories in Africa and victories over the Ostrogoths in Italy. Turning his attention to the laws, Justinian commissioned ten learned civilians to draw up a new code, and the result was the *Corpus Juris Civilis*. He took great interest in building cities, fortifications and churches and rebuilt the Church of Saint Sophia at Constantinople. To maintain his public munificence he oppressed the people with taxes and suffered his servants to commit the most flagrant crimes. His reign of thirty-eight years was a great period in the history of the Empire, but the emperor himself was by no means great.

Jute, a textile fabric obtained from a plant belonging to the same family as the basswood. The jute plant is a native of the warmer parts of India, where its cultivation is carried on,

Jutes

especially in Bengal, on an extensive scale. It is an annual, growing to a height of 12 or 14 feet. The fiber forms the inner bark of the plant and possesses in an eminent degree that tenacity common to the bark of the plants of this order. The fiber is fine and has a shining surface; it is injured by exposure to water and hence is not well adapted for cordage and canvas, but



JUTE PLANT

it is in extensive use for making bags, and in the United States and Great Britain it is mixed with hemp for cordage, and with silk in the manufacture of cheap satins. Its principal use is in the manufacture of coarse cloth for bagging and in making the foundation of inferior carpets and mats. In Bengal, jute has been cultivated, and its fibers have been woven into fabrics, from a remote period, but it is only since about 1830 that its manufacture has risen to importance in Europe. The headquarters of this branch of industry are at Dundee. The rice, cotton, sugar, coffee, pepper and other articles of East Indian commerce are almost wholly carried in gunny bags made from jute.

Jutes, a German tribe that assisted the Angles and Saxons in their conquest of England, in the fifth century. See ANGLO-SAXONS.

Jutland

Jut'land (Danish, *Jylland*), the peninsula and most important portion of Denmark, surrounded on three sides by the sea—the Skagerrak, the Cattegat and the North Sea—and on the s. by Schleswig; it has an area of 9755 sq. mi. The surface is generally low and is diversified by a ridge of hills through the center of the peninsula. The west coast is sandy, and the east coast has many fjords. The inhabitants are considered to be the most genuine specimens of the old Danish stock and have preserved both the language and the manners and customs of early times in their greatest purity. The earlier inhabitants, the Jutes, took part in the expedition of the Saxons to England (See DENMARK). Population in 1901, 1,061,904.

Ju'venal, DECIMUS JUNIUS JUVENALIS, a Latin satirical poet, born probably about the

Juvenal

middle of the first century A. D. He is said to have been the adopted child of a wealthy freedman; to have been by profession a pleader; to have been the friend of Martial, and to have died in Egypt as an exile in charge of a cohort of infantry. Nothing of this is authentic; we know certainly only that he resided in Aquinum and flourished about the end of the first century after Christ. His extant works are sixteen satires, composed in hexameters, giving in powerful language, inspired by a bitter and heartfelt indignation, a somber picture of the corrupt Roman society of that era. His satires have also been translated by Gifford and some of them by Dryden, while Johnson's imitations of two of them, under the titles *London* and the *Vanity of Human Wishes*, are well known.



K, the eleventh letter of the English alphabet, derived in its form from the Phœnician character, which resembled a reversed *k*. In Anglo-Saxon this letter was little used, *c* being regularly substituted for it. Gradually, however, it came to replace *c* in positions where the latter would be ambiguous in sound. It has but the one sound, and it is silent before *n*. In words of one syllable *k* is often used after *c* as a final letter, to secure the proper pronunciation of derived forms, as in *crack*, *cracked*.

Kaaba or **Caaba**, *kah'ba*, the sacred shrine at Mecca to which Moslems make their pilgrimages. It is a flat-roofed quadrangular structure about 40 feet high, 55 feet long and 45 feet broad, and stands in the center of the mosque, or sacred area, which is inclosed by walls and colonnades. At the southeast corner of the Kaaba, built into the wall, is the famous "black-stone," or *Keblah*, which is devoutly kissed by the pilgrim and is the point to which every pious Moslem directs his face in prayer.

Kabul or **Cabul**, *ka bool'*, capital of Afghanistan, 80 mi. n. n. e. of Ghuzni. It is situated on the Kabul River, at an elevation of 6400 feet above sea level. The citadel, Bala-Hissar, contains the palace and other public buildings and the fort. Kabul carries on a considerable trade with Hindustan through the Khyber Pass and is the center of an important fruit-growing district. It was taken by the British in 1839, in 1842 and again in 1879. Population, about 60,000.

Kadiak, *kad yak'*, an island south of Alaska, belonging to the United States. It is rocky and of little agricultural value. The inhabitants, below 3000 in number, resemble the Eskimos and live by hunting and fishing. A considerable fur trade is carried on, and the catching and canning of salmon is an important industry.

Kadiak Bear. See BEAR.

Kaffir Corn, a variety of millet. The seed was first brought from Kaffraria in Africa, but

the plant is now grown extensively in those Western states which are subject to drought.

Kaffirs, **Kafirs**, **Kaffres** or **Caffres**, *ka'f'urz*, the principal race inhabiting south-eastern Africa, a branch of the great Bantu family. The name is now chiefly restricted to the tribes occupying the coast districts between Cape Colony and Delagoa Bay. They differ from the negroes in the shape of the head, which is more like that of Europeans, and in the high nose, frizzled hair and brown complexion, which becomes lighter in shade in the tribes of the more southern districts. They are a tall, muscular race, frugal and simple in their habits. Their chief occupation is raising and tending cattle and hunting; garden and field work is mainly performed by women. They have many times been in fierce and bloody conflict with the English, who every time have been successful in still further circumscribing the territory of the nations.

Kaffra'ria. See KAFFIRS.

Kaftan or **Caftan**, *kah'fan*, a long gown or vest, worn by the Turks, Persians and other Eastern peoples. It is the national garment of the Turks. It is made of woolen or silk stuff and is sometimes lined with fur.

Kailas, *ki lahs'*, a sacred mountain of the Hindus, the highest peak of the Gangri Mountains in Tibet. It is situated between the sources of the Brahmaputra and the Indus and has an altitude of over 22,000 feet. It is believed by the natives to be the dwelling place of the gods.

Kaiser, *ki'zur*. See GERMANY, subhead *Government*.

Kaiser Wil'helm Canal, or **Baltic and North Sea Canal**, a canal extending from Holtenau to Brunschüttel and connecting the Baltic Sea with the North Sea. It was completed in 1895. It is 61.3 miles long, 190 feet wide at the surface and 29.5 feet deep. The cost was \$39,000,000. This canal was constructed by the German government for military and

naval purposes, but it is used by merchant ships and passenger steamers. It cuts off the voyage around Denmark and saves 200 miles in going from Hamburg to the English Channel.

Kalahari, *kah'la hah're*, **Desert**, a region in central South Africa, north of the Orange River, extending about 400 miles from east to west and 600 miles from north to south. It is very flat, is subject to long-continued droughts and has only dried-up river beds; nevertheless it is not devoid of vegetation, patches of grass and shrubs occurring here and there in the interior. An abundant supply of watermelons and some remarkable varieties of tubers, together with large herds of antelopes and other game, provide ample subsistence to the bushmen and Bakalahari inhabiting this barren region. See **DESERT**.

Kalamazoo', **MICH.**, the county-seat of Kalamazoo co., 50 mi. s. of Grand Rapids, on the Kalamazoo River and on the Lake Shore & Michigan Southern, the Michigan Central and several other railroads. The city is in an agricultural district where celery is the chief product, along with considerable quantities of fruits and grains. Kalamazoo College and the Michigan Female Seminary are located here. Other important structures are the Michigan Asylum for the Insane, the city hall, the post-office, the public library and the Y. M. C. A. building. The manufactures include paper, wagons, buggies, windmills, engines, machinery, undertakers' supplies and various articles for women's wear. The place was settled by the Titus brothers in 1829 and was chartered as a city in 1884. Population in 1904, 29,782.

Kalb, *kahlp*, **JOHANN**, Baron de (1721-1780), a German-American soldier, born in Bavaria. He entered the French army in 1743 and received several promotions, becoming lieutenant general in 1761. Some years later he was a secret emissary of the French government in America and returned to France with a report favorable to the American cause. In 1777 he was persuaded by American representatives in Europe to join Lafayette's expedition, and upon arrival in America he was made a major general. He served with credit throughout the war, was second in command to General Gates in the South and commanded the American forces at Camden. In this engagement he received eleven wounds, from which he died a few days later.

Kaleidoscope, *ka li'do skope*, a well-known optical toy, invented by David Brewster, by

which an infinite variety of symmetrical, and often beautiful, colored designs is obtained. The ordinary kaleidoscope consists of a tube containing three glass plates acting as mirrors, which extend along its whole length and make an angle of 60° with one another. One end of the tube is closed by a metal plate with a small hole at its center, to which the eye is applied; at the other end there are two plates, one of ground glass, the other of clear glass, the latter being nearer the eye. A number of pieces of colored glass or beads lie loosely between them. When the eye is applied to the aperture the mirrors produce a beautiful, symmetrical figure, and when the tube is turned about or shaken, new images, always symmetrical, are formed. This arrangement may be modified in various ways. The instrument has been used by designers of patterns for calicoes and other fabrics.

Kal'ends. See **CALENDAR**.

Kalevala, *kah'la vah'lah*. The Finnish poems which have been preserved by oral tradition from the times of heathendom, were gradually dying out, when Lönnrot grouped together, in one whole, all the fragments he could find and published them as the national epic of the Finnish people, under the title of *Kalevala*.

Kali, *kah'le*, a Hindu goddess, one of the forms of the wife of Siva, therefore in some respects corresponding to Durga and other deities. She has four arms, and wears a necklace of skulls and a belt of the hands of slaughtered giants. In one hand she holds a sword, in another a human head. She is the goddess of death and destruction, and goats and other animals are sacrificed on her altars.

Kal'ispel or **Pend D'Oreille**, a tribe of indians which formerly occupied a portion of Idaho and Washington, whence they sallied into the plains for an annual buffalo hunt. The greater portion are now with the Flathead and Kootenai indians in Montana.

Kal'mia, a genus of North American shrubs, which bear cup-shaped rose or purple flowers in clusters. The kalmias belong to the heath family and are known commonly in the United States as laurel. All are more or less poisonous when eaten. The *mountain laurel*, or *calico bush*, has been carried from its home in the Alleghany Mountains to Europe, where it is a favorite garden shrub. The flowers of the kalmia have a peculiar arrangement for fertilizing themselves. When the flower opens, the stamens are bent back away from the pistil and

are held in little pockets in the corolla. Whenever an insect touches them they fly loose, scattering the pollen from little holes in the tops of the anthers. Some of the pollen falls upon the insect and is by him carried to the stigmas of other flowers, and in this way cross fertilization is secured. Under favorable conditions the trunk of the mountain laurel attains a diameter of three inches, and as the wood is hard like box, it is used by turners for small objects, such as handles to tools. The *sheep laurel*, or *lamb kill*, sometimes called *staggerbush*, is a small species of *kalmia* that poisons sheep.

Kal'mucks or **Calmucks**, a wandering, warlike Mongol race, originally natives of the territory of central Asia, but now inhabiting not only parts of the Chinese Empire, but also districts of Siberia and European Russia. They are intrepid soldiers and splendid horsemen, and troops of them are attached to almost every Cossack regiment. Many of the Russian Kalmucks have been converted to Christianity. Physically they are small of stature, broad-shouldered, with small, round heads and narrow, oblique eyes.

Kama, *kah'ma*, a river in Russia, rises in the northeastern part of the country and flows southerly and southwesterly and enters the Volga at Spask. Its length is about 1200 miles, and it is the longest tributary of the Volga. One of its tributaries is connected with a tributary of the Dvina by canal, so that it forms an important link in the waterways of the part of Russia through which it flows.

Kama, the Hindu god of love, corresponding, generally speaking, to the Greek Eros and Roman Cupid. He is represented as a beautiful youth riding on a parrot. He carries a bow, with a string formed of bees, and five arrows, each tipped with a flower.

Kamerun, *kah'me roon*, or **Cameroon**, a German colony in West Africa, at the head of the Bight of Biafra. It is bounded on the s. and e. by the French Kongo and on the n. w. by the British colony of Nigeria. The country takes its name from the Kamerun River, which flows in a southwesterly direction through it. Another and still longer river, the Sanaga, flows into the sea a little south of the Kamerun and is navigable for forty miles. The Kamerun Mountains extend through the colony from the southwest to the northeast and in some places attain an altitude of 13,760 feet. The most important products are the banana, the oil palm, the sweet potato, the ground nut, the

manioc and the yam; and tobacco, coffee and cocoa are also successfully cultivated. A considerable trade in oil, cotton and ivory is carried on. The majority of the inhabitants are Bantus. Kamerun is the chief trading town and seat of government. The government is administered by a local governor, but his influence over the interior is only nominal. Germany annexed the coast in 1884 and the interior soon after. Population, estimated at 4,500,000; area, about 191,000 square miles.

Kamtchatka, *kam chat'ka*, a large peninsula in the northeast of Asia, between the Bering Sea on the e. and the Sea of Okhotsk on the w. It is about 700 miles long, from 70 to 250 miles wide and has an area of 104,000 square miles. The chief wealth of the country lies in its fur-producing animals, which include the sable, the Arctic fox, the beaver and the bear. The Kamtchadales, once the predominant race of the peninsula, are a branch of the Mongul family, a low type, physically and morally; but they are rapidly vanishing before the Russian settlers. The Koryaks are a wandering tribe, living in the northern districts. Population, estimated at 7500.

Kanakas, *ka nah'kas*, the native inhabitants of the Hawaiian Islands. In New Caledonia and the New Hebrides the name is applied to all the native laborers, without distinction of origin.

Kanawha, *ka naw'wa*, **River**. See GREAT KANAWHA.

Kandahar' or **Candahar'**, a town of considerable commercial and strategical importance in the south of Afghanistan, on the direct route to India, 210 mi. s. w. of Kabul. It lies 3484 feet above the sea, and has a large transit trade in silk and felt, chiefly carried on with British India. The town is said to have been founded by Alexander the Great. Population, estimated between 25,000 and 50,000.

Kandy, *kahn'de*, a fortified town in Ceylon, the former capital of the island, situated 82 mi. from Colombo. It contains the palace of the former king and a number of Buddhist temples. Near by are botanical gardens of considerable celebrity. Population in 1900, 26,522.

Kane, PA., a borough in McKean co., 95 mi. s. e. of Erie, on the Baltimore & Ohio, the Pennsylvania and other railroads. It has an elevation of over 2000 feet, with a healthful climate and good hunting and fishing, and has become a popular resort. The region is rich in oil and natural gas, and large glass works, lumber mills, wood-working shops and other fac-

tories are located here. Population in 1900, 5296.

Kane, ELISHA KENT (1820-1857), an American surgeon, traveler and Arctic explorer. He obtained the degree of M. D. at the University of Pennsylvania in 1842, was attached as surgeon to the American mission to China and afterward visited India, Egypt and Greece. In 1846 he rendered important service as a volunteer in the United States army in Mexico, and in 1850 he joined the Grinnell Expedition, as medical and scientific member, in the unsuccessful search for Sir John Franklin. His observations led him to the belief that there was a large open sea near the pole, and with a view to penetrate it he organized and commanded a second expedition, which left New York in the *Advance* in May, 1853. He succeeded in getting as far as 78° 43' north latitude, where he was frozen in for twenty-one months. Finally, being harassed by scurvy and want of provisions, he was obliged to abandon the vessel. A perilous journey of 1300 miles in boats and sledges brought him back to Greenland, and he again reached New York in November, 1855. Much broken in health, he sailed for Cuba to recuperate, but died there. (See NORTH POLAR EXPLORATION.)

Kan'garoo', the common name of a number of animals native of Australia. The most



KANGAROO

noticeable feature about the kangaroo is the disproportion between the upper and lower parts of the body. The head is small and deer-like in shape, with large ears; the fore legs are small, and the hind legs are relatively large and powerful.

The tail is long and thick at the base and helps to support the animal when it sits erect, and to assist it in its long leaps. The young are born very immature and are protected and nourished for about eight months in a pouch on the mother's abdomen. Kangaroos live entirely upon vegetable growths, and where still plentiful, they are a serious pest to farmers. They are very timid, but are alert in time of danger. The kangaroos include many species, varying in size from that of a hare to that of a large sheep, and remains of still larger extinct species have been found in Australia. The larger and more common kinds belong to a genus including the *giant kangaroo*, the *red kangaroo* and the *brush kangaroo*. The animals are hunted for their hides, which make excellent leather, and also for their flesh.

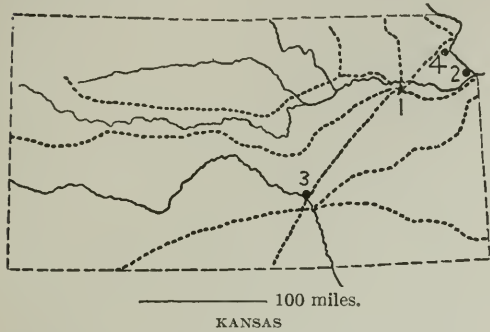
Kankakee', ILL., the county-seat of Kankakee co., on the Kankakee River and on the Illinois Central, the Cleveland, Cincinnati, Chicago & Saint Louis and other railroads. The city is in an agricultural region. The most important manufactures are agricultural implements, furniture, wagons, shoes and starch. There are also extensive limestone quarries and brick and tile yards in the vicinity. It is the seat of the Eastern Illinois Hospital for the Insane. Other fine buildings are the Arcade, the county jail, the opera house, the public library, a conservatory of music and the Y. M. C. A. building. Saint Viateur's College, a prominent Roman Catholic divinity school, is located at Bourbonnais Grove, a suburb three miles distant. Kankakee was settled in 1853 and was incorporated the next year. Population in 1900, 13,595.

Kan'sas, the SUNFLOWER STATE, is located in the geographical center of the Union and is bounded on the n. by Nebraska, on the e. by the Missouri, on the s. by Oklahoma and on the w. by Colorado. With the exception of the northeast corner, where the boundary is formed by the Missouri River, the state is a rectangle. Its length from east to west is 410 miles, its width from north to south is 210 miles and its area is 82,080 square miles. Population in 1905, 1,544,968.

SURFACE AND DRAINAGE. The state occupies a portion of the great plain lying between the Rocky Mountains and the Mississippi River. As a whole it is an undulating plain, rising at the rate of about $7\frac{1}{2}$ feet per mile from the eastern to the western boundary. The average altitude of the eastern boundary is about 800 feet, and that of the western boundary is about 3500 feet. The highest point is in Sherman County, on the

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extreme western boundary, and is over 4400 feet in altitude. In general the surface of the state is characterized by low swells, separated by shallow valleys. Here and there are hills rising above this plain to the height of 400 or 500 feet and giving some variety to the scenery. The banks of streams in the eastern portion of the state are characterized by bluffs, varying in altitude from 100 to 200 feet; but the streams in



1, Topeka; 2, Kansas City; 3, Wichita; 4, Leavenworth.

Dotted lines indicate chief railroads.

the western part of the state flow through shallow valleys and have low banks.

The Missouri drains the northeastern portion of the state, and the remainder is divided between the basins of the Kansas and the Arkansas. The Kansas and its tributaries flowing eastward drain all of the northern half of the state, and the Arkansas, flowing eastward through a little more than half of the state and then bending southward, with its tributaries drains the remainder. Among the important tributaries of the Kansas River are the Republican, the Smoky Hill and the Solomon. The Verdigris flows into the Arkansas. The Missouri and the Kansas are navigable in the lower parts of their courses, but in general the streams are shallow and have but little fall, though a few of the smaller tributaries have sufficient fall to afford some water power.

CLIMATE. Kansas has a temperate climate, characterized by extremes of heat in the summer and occasional cold waves in the winter, though as a whole the climate is pleasant and healthful. The atmosphere is clear and dry, and throughout the year there are many sunny days. The winters are short and mild, and but little snow falls. The mean annual temperature in the northern part of the state is about 50° and in the south about 55°. The mean rainfall for the entire state is about 27 inches, but it is much heavier in the eastern third than elsewhere.

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Here it exceeds 35 inches. In the central third of the state it is about 25 inches, and in the western third it is from 10 to 15 inches.

MINERAL RESOURCES. The southern counties contain extensive deposits of bituminous coal, which are worked in a number of places and yield a sufficient quantity of coal for all local purposes and for large shipments to other localities. There are also in this vicinity deposits of lead ore and of zinc, the latter being extensively mined. To the northwest of the zinc and lead deposits is an extensive field of natural gas, and a little to the north and west of this are considerable deposits of petroleum, yielding about 1,000,000 barrels per year. Gypsum, limestone, chalk and large deposits of salt, clay and other minerals are scattered through the state and in many localities appear in workable quantities. The output of salt amounts to about 2,000,000 barrels a year.

AGRICULTURE. Agriculture is the chief industry of the state. The soil is fertile, and the climate is well suited to growing all products that can be raised in a temperate climate. The only drawback to agriculture is the lack of rainfall in the western third of the state; however, the annual rainfall of this district is noticeably increasing. In the eastern third the chief crops are corn, oats, rye, potatoes, sorghum, broom corn, hay, hemp, flax and fruit. The central portion of the state is devoted to raising winter wheat, and in the production of this variety of wheat Kansas leads the other states of the Union. In this region are also found many thriving fruit orchards which assure the farmer a full crop every year. Alfalfa is quite generally raised throughout the state. The western third of the state is very generally devoted to the raising of live stock, for which it is abundantly suited, since there is sufficient moisture for grazing purposes and the mild winters allow stock to remain without shelter. The Arkansas valley, in the western part of the state, is largely devoted to sugar-beet culture. Large numbers of cattle, horses and sheep are marketed from the state every year, and the wool clip exceeds 2,000,000 pounds.

MANUFACTURES. Compared with agriculture, manufacturing is of minor importance. The leading industries, in the order of their value, are slaughtering and meat-packing, with their chief center in Kansas City; the manufacture of soap, butter, cheese and condensed milk; building and repairing cars and other rolling stock for large railroads; the manufacture of flour and

other grist mill products, beet sugar, foundry and machine shop products. Other major industries include glass factories, brickyards and carriage factories.

TRANSPORTATION AND COMMERCE. The eastern and central portions of the state are well supplied with railway lines, and a number of trunk lines extend through the state from east to west, but in the western third there are few cross-lines connecting these, so that some portions of this part of the state are without direct railway communication. Kansas City, Fort Scott, Wichita, Parsons, Coffeyville, Hutchinson and Topeka are important railway centers.

The commerce of the state is extensive and is constantly growing. It consists in the export of live stock and packed meats, wool, fruit, wheat, corn and other agricultural products, and the importation of manufactured goods and prepared foods.

GOVERNMENT. The legislature is composed of a senate, restricted to 40 members, and a house of representatives, restricted to 125 members. The senators are elected for four years, and the representatives for two years. The legislature meets biennially, and the session cannot exceed fifty days. The executive department of the government consists of the governor, the lieutenant governor, the secretary of state, the auditor, the treasurer, the superintendent of public instruction, the attorney-general, the secretary of labor statistics, the superintendent of insurance and the secretary of horticulture, each elected for two years. There are also several administrative boards, such as the state agricultural society, the board of railroad commissioners, the board of control of charitable institutions and the free employment agency. The governor, the secretary of state, the treasurer, the auditor, the superintendent of public instruction and the attorney-general constitute an executive council. The judiciary department is vested in a supreme court consisting of seven judges, elected for six years, and thirty-three district judges, who preside over the courts in their respective districts. Each county has a probate judge and a clerk of the district court. The large cities have city courts, while townships, villages and cities have justice courts for the trying of petty cases.

EDUCATION. The state maintains a good system of public schools. The widely scattered rural population in the western part of the state is adopting the consolidated school idea. The school fund is derived from the sale of school

lands, two sections to each township, and is supplemented by local taxation. The public schools of the state are under the supervision of the superintendent of public instruction, and those in each county are under the supervision of the county superintendent. Cities of the first and second class are each under a city superintendent employed by the board of education of the city. The people throughout the state manifest deep interest in education, and advancement is constantly being made in all grades of schools. The state university at Lawrence is at the head of the public school system, and graduates from high schools whose courses of study and work are approved by the university are admitted to that institution without examination. There is a state normal school at Emporia, with a branch school at Hays and another for industrial branches at Pittsburg. Graduates of schools of collegiate rank, accredited by the state board of education, are granted three years' state certificates. The state agricultural college and experiment station are at Manhattan. Besides these there are numerous colleges and secondary schools maintained by religious denominations. Among those worthy of mention are Baker University at Baldwin, Fairmount College at Wichita, Friends' University at Wichita, Southwest Kansas College at Winfield, Ottawa University at Ottawa and College of Emporia at Emporia.

INSTITUTIONS. The school for the deaf and dumb is at Olathe, and that for the blind is at Kansas City. There is a soldiers' orphans' home at Atchison and a national soldiers' home at Leavenworth. The state soldiers' home is located at Dodge City. The state penitentiary is at Lansing, and the industrial reformatory is at Hutchinson. A Federal prison is near Leavenworth. The state also maintains an industrial school for girls at Beloit and a reform school for boys at Topeka.

CITIES. The chief cities are Topeka, the capital, Kansas City, opposite Kansas City, Mo.; Wichita, Leavenworth, Atchison, Lawrence, Fort Scott, Pittsburg, Parsons, Hutchinson, Coffeyville and Emporia, each of which is described under its title.

HISTORY. Kansas was first visited by Spaniards under Coronado about 1541, but it was not again explored until the eighteenth century, when Frenchmen passed through it. It came into the possession of the United States in 1803 as part of the Louisiana Purchase, was explored by Lewis and Clark in the following year and by Pike two years later, and Fort Leavenworth

was established by the government in 1827. It was a part of the Territory of Missouri in 1821, but from that time until 1854 it was an unorganized territory. In that year occurred the great contest over organization, precipitated by the Kansas-Nebraska Bill. Several attempts to form constitutions and elect legislatures were made, and a lively contest ensued between immigrants from the South and from the North to gain control of the state. A pro-slavery party gained the first success in 1855, but in October of the same year a convention of free state men met at Topeka and adopted a constitution prohibiting slavery. An election was held under this instrument in January, 1856, and a free state governor was chosen, the pro-slavery party taking no part in the election. In 1856 occurred the famous raid of John Brown at Pottawatomie Creek (See BROWN, JOHN). With the aid of Federal troops the free state legislature was prevented from meeting, but a constitution adopted by the pro-slavery party at Lecompton, in November, 1857, was voted down. The immigration from free states thereafter became so preponderant that a constitution, adopted in 1859, prohibiting slavery, was finally ratified, and the state was admitted to the Union, Jan. 29, 1861. In the Civil War, Kansas contributed more than its quota of soldiers to the Union armies. After the war the state received a great impetus by the development of railroads. The principle of prohibition has been incorporated in the state law after a long struggle, and the state has also taken advanced ground in opposition to railway and other trusts. Kansas has been almost uniformly Republican since the Civil War. Consult Spring's *Kansas*, in the American Commonwealths Series.

Kansas, UNIVERSITY OF, a state institution of learning, established at Lawrence, Kan., in 1864. The campus includes 170 acres, and the buildings number thirteen. The value of the buildings and equipment is \$1,335,000. The university comprises eight schools—a college of liberal arts; a graduate school; the department of law; the department of medicine; the department of pharmacy; the department of engineering, including electrical, mechanical, mining and chemical; the department of fine arts, and the University Geological Survey. The faculty numbers over ninety, not including numerous lecturers of note; the enrollment is about 1700. The library contains 42,000 volumes, and the natural history collection is valued at \$200,000.

Kansas City, Kan., a city and the county-seat of Wyandotte co., on both sides of the Kansas River at its confluence with the Missouri, opposite and connected with Kansas City, Mo., on the Missouri Pacific, the Union Pacific, the Atchison, Topeka & Santa Fé and the Chicago, Rock Island & Pacific railroads. Kansas City is the site of the state institution for the blind and of the Kansas City University. It has a large and fine high school and a fine library building, costing \$75,000. The live stock interests are very important, and Kansas City, Kan., is the second largest live stock center in the United States. The industries include grain elevators, flour mills, railroad car and machine shops, manufactures of soap, foundry products and other articles. The city, known as Wyandotte, was chartered in 1886. Its recent growth has been very rapid. Population in 1905, 67,614.

Kansas City, Mo., a city of Jackson co., at the junction of the Kansas and Missouri rivers, opposite and connected with Kansas City, Kan., on the Chicago & Alton, the Atchison, Topeka & Santa Fé, the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago, Rock Island & Pacific, the Chicago, Milwaukee & Saint Paul and other railroads. Among the chief structures are the United States custom-house, a large public library building, the art gallery and museum, the city hall, the courthouse and the office buildings of several life insurance companies. The charitable and educational institutions include the Kansas City School of Law, University Medical College, Scarritt Training School and several hospitals. The city is a very important commercial center. It is in the midst of a rich agricultural region, and its trade in grain and live stock is especially great. Its industrial and commercial interests are closely allied with Kansas City, Kan. There are important manufactures of foundry and machine shop products, confectionery, clothing and malt liquors. The first settlement was made in 1821. In 1838 the town was laid out, and it was incorporated as a city in 1853. Population in 1900, 163,752.

Kansas-Nebraska Bill, a bill passed by the Congress of the United States in 1854 separating and organizing the territories of Kansas and Nebraska. It was introduced by Stephen A. Douglas. It was chiefly important as embodying the "squatter sovereignty" idea of Douglas, that is, as expressed by the bill, that "all questions pertaining to slavery in the territories and the new states to be formed therefrom, are to be

left to the decision of the people residing therein, by their appropriate representatives." This provision would have overridden the Missouri Compromise, which prohibited slavery north of the latitude of 36° 30'. The original bill was superseded by another prepared by Douglas, which distinctly repealed the slavery clause of the Missouri Compromise. The bill passed the Senate against the opposition of Sumner, Chase, Everett, Seward and others, and it passed the House after a long and bitter struggle. It revived the bitter slavery contest which had been allayed by the Compromise of 1850, for it practically opened to slavery an area of 500,000 square miles, including the present states of Kansas, Nebraska, Montana, North Dakota, South Dakota, Wyoming and part of Colorado. It was immensely important in hastening the Civil War.

Kansas River, a river of Kansas, formed by the junction of the Republican and the Smoky Hill (the latter rising in the Rocky Mountains). It traverses the state in an easterly direction and falls into the Missouri near Kansas City. It is 250 miles long and is not important for navigation. Topeka, Lawrence and Junction City are on its banks.

Kant, *kahnt*, IMMANUEL (1724-1804), a celebrated German philosopher, born at Königsberg, Prussia. He was educated at the University of Königsberg, where he supported himself as a private tutor and later served as a lecturer until 1770, when he became professor of logic and metaphysics, a position which he held until old age. Kant's personal appearance and manner of living gave no suggestion of the strength of his influence. He was small of stature, being scarcely more than five feet tall, and lived a most methodical, unpretentious life. Although he was deeply interested in travels and in descriptions of the characteristics and customs of foreign nations, it is said that he was never outside the borders of the province in which he was born.

Kant attempted to reconcile the conflicting philosophical systems which had dominated the seventeenth and eighteenth centuries. In doing this, he constructed a new system, in which the contradictory theories were reconciled. Kant's greatest work, *The Critique of Pure Reason*, contains a complete exposition of his philosophy, and through it and other writings he exerted a more potent influence upon thought than any other man of his time. His other important works are *The Critique of Practical Reason* and *The Critique of the Power of Judgment*.

Ka'olin, a name first given by the Chinese to a pure white clay used by them in the manufacture of porcelain. Kaolin is a product of the decomposition of granite rock, containing feldspar, mica and quartz. Similar clays, differing slightly in color and in the percentage of constituents, are found at Schneeberg in Saxony, furnishing the material of Dresden china; at Limoges, in France, employed for Limoges ware, and at Saint Austell, in Cornwall, the source of supply for the British potteries. In the United States kaolin is found in Nebraska, North Carolina, Delaware, Georgia, Pennsylvania, Connecticut and Vermont, but the best quality is obtained from Cornwall, England. In its natural state kaolin somewhat resembles mortar; by sorting and repeated filtration it is freed from all coarse ingredients, then dried in pans and sheds and sent into the market cut into blocks. When burned it becomes pure white. See POTTERY.

Karakorum, *kah'ra ko'rum*, **Mountains** or **Mustagh Mountains**, a mountain range in Central Asia, forming a sort of rampart between Kashmir and Eastern Turkestan. Mount Godwin-Austen, 28,278 feet in height, is, after Mount Everest, the highest mountain in the world, while the average elevation of the range is great.

Karikal, *ka re kah'*, a French settlement in India, on the Coromandel coast, 150 mi. s. of Madras. It has an area of 63 square miles. The town carries on an extensive trade in rice. Population, 70,526.

Karlsbad or **Carlsbad**, *kahr'ls'baht*, (Charles's bath), a town of Bohemia, famous for its hot mineral springs, and much frequented by visitors from all parts of the world. The principal spring, the Sprudel, has a temperature of 165°. Sulphate of soda, carbonate of soda and common salt are found in these waters, which are valuable in cases of diabetes, gout and dyspepsia. Population in 1900, 14,600.

Karlsruhe or **Carlsruhe**, *kahr'ls'roo a*, (Charles's rest), the capital of the grand duchy of Baden, Germany, situated near the Rhine, 30 mi. n. w. of Stuttgart. The city is noted for its well-paved streets and for its excellent buildings and monuments. Among the important buildings are the palace of the grand duke, the Evangelical church, the Roman Catholic church, the court theater and the new palace of the crown prince. Besides a court library, which contains 100,000 volumes, there are also a large public library, several valuable museums

Karnak

and art collections, a botanical garden and a school of forestry. The chief industries are the manufactories of locomotives, machinery, stoves, wagons, paper and stone ware. Karlsruhe dates its beginning from a hunting palace erected in 1715 by the margrave Karl Wilhelm. Population in 1905, 111,200.

Karnak, *kahr'nak*. See THEBES.

Kaschau, *kah'show*, a city of Hungary, capital of the County of Abauj-Torna, 170 mi. n. e. of Budapest. It is beautifully situated, surrounded by vineyards, and is one of the best-built towns in Hungary. The chief buildings are an old Gothic cathedral, Saint Michael's church, the townhall, the Episcopal palace, a theater, the oldest in Hungary, and a royal law school. The manufactures include paper, spirits, flour, tobacco and wooden products, and the trade is extensive. Population in 1900, 40,102.

Kashgar, *kahsh gahr'*, a city of central Asia, in Eastern Turkestan, on a river of the same name. It has considerable manufactures of cotton, linen, gold and silver cloth, and carpets, and is the center of an extensive trade. Population, estimated at from 60,000 to 70,000.

Kashmir or **Cashmere**, *kash meer'*, an extensive principality in the northwest of Hindustan, subject to a ruler belonging to the Sikh race. It is politically subordinate to the British Indian Empire. The area is estimated at 80,900 square miles. Kashmir proper, which forms a small portion of the whole, is a valley surrounded by mountains, the Himalaya and Hindu Kush, and traversed by the river Jhelum. There are ten chief passes through the mountains into this valley, varying in height from about 9000 to 12,000 feet. The elevated situation of the valley and the mountains of snow which surround it render the climate rather cold; but the region is well watered by streams and is very fertile. Forests on the slopes, fields of corn, rice crops along the sides of the rivers, rich orchards and an abundant growth of flowers distinguish the district. The common European fruits are grown, and attention is now being paid to the culture of the vine. The chief crops are wheat, barley, rice and Indian corn, and two harvests are reaped in the year. The chief manufacture is that of the celebrated Cashmere shawl. The capital of the whole principality is Jamoo. Srinagar, or Kashmir, is the maharajah's summer residence and is the largest town. Population of the principality, 2,905,578. For picture of Kashmir ruler, see RACES OF MEN, *color plate*, *Mongolian Types*, Fig. 10.

Kaukauna

Kaskas'kia River, a river of Illinois, rising in the east central part of the state and flowing south by west and entering the Mississippi at Chester. Its length is about 300 miles, and it is navigable for about 150 miles.

Kas'sel. See CASSEL.

Katah'din, one of the prominent peaks of the Appalachian Mountains, situated in the northern part of Maine, the most prominent peak in the state. Its altitude is 5200 feet. It is located in the midst of a wilderness and is formed principally of granite. An extended view of the surrounding country can be obtained from its summit.

Katrine, *kat'rin*, LOCH, a picturesque and much frequented lake in Scotland, County of Perth, 5 mi. e. of Loch Lomond. It is 9½ miles long and 2 miles wide. The scene of Scott's *Lady of the Lake* is largely laid here. All around the lake are lofty mountains, and the scenery is very beautiful.

Kat'tegat. See CATTEGAT.

Katydid, a species of grasshopper, found in some parts of North America. The insect is about an inch long and of a pale green color. It is named from the noise made by rubbing the drum-like organs in the wing covers against each other. The females are noiseless.

Kauffman, *kowf'man*, ANGELICA (1741-1807), a German painter. At an early age she went to Italy to study, where she first attracted attention by her portraits. In 1763 she studied ancient art under Winckelman at Rome, but two years later went to England, where she was received with great favor. She was made one of the original members of the Royal Academy in 1769. After her marriage to Zucchi, a Venetian painter, she returned to Italy, where her house became the favorite resort for artists and scholars. Her works are marked by grace and charm, but lack vivacity. Among her historical paintings are *Mother of the Gracchi*, *Anna and Abra* and *The Sacrifice of Messalina*. Other works are *Death of Leonardo da Vinci*, *Ariadne and Theseus* and the well known *Vestal Virgin*.

Kaukauna, Wis., a city in Outagamie co., 7 mi. n. e. of Appleton, on the Fox River and on the Chicago & Northwestern railroad. There is good water power, and the industrial establishments include railroad shops, pulp and paper mills, brick and tile works, flour and planing mills, foundries and machine shops. Population in 1905, 4991.

Kaulbach, *koul'bahK*, WILHELM VON (1805-1874), one of the greatest of modern German painters. He studied at the art academy of Düsseldorf under Cornelius and subsequently succeeded in the Munich academy. His most ambitious pictures, with the exception of the *Madhouse*, are to be found in a series utilized in the decoration of the Berlin Museum depicting the progress of the human race in typical scenes from the great historic periods. This series comprises the *Tower of Babel*, *Age of Homer*, *Destruction of Jerusalem*, *Battle of the Huns and Romans*, the *Crusades* and the *Reformation*. His works show strong power of characterization, and in some cases reveal the keen satire of the painter.

Kaunitz, *kow'nits*, WENZEL ANTON DOMINIK, Prince (1711-1794), an Austrian statesman, the great minister of Maria Theresa. His most famous service to Austria was the alliance which he concluded with France, the hereditary enemy of Austria, against Frederick the Great. His influence in the government declined under Joseph II and Leopold II, and in 1792 he retired.

Kaw, a tribe of Siouan indians which formerly lived near the mouth of the Kansas River, though now the small remnant of them are with the Osage on a reservation in Oklahoma.

Kazan, *ka zahn'*, a city of European Russia, capital of the government of same name, situated on the Kazanka, about 4 mi. above its junction with the Volga, 430 mi. e. of Moscow. It is an extensive city and is strongly fortified. There are several mosques, a cathedral and several monuments. The university is a great seat of Oriental learning, with nearly 1000 students. The city has large wool-combing, weaving and dyeing establishments, tanneries and soap works, and a government dockyard is in the vicinity. The timber, flour and hemp fairs of Kazan are among the largest in the Russian Empire. Population in 1900, 143,707.

Kean, *keen*. CHARLES JOHN (1811-1868), an English actor, son of the celebrated Edmund Kean. He was educated at Eton. In 1830 he visited America, established his reputation as an actor and three years later appeared in *Othello* as Iago, his father having the rôle of Othello. He married the accomplished actress Ellen Tree in 1842, revisited the United States and later became sole lessee of the Princess Theater, London, where he put some of Shakespeare's plays on the stage with a splendor never before attempted. In 1868 he made a tour to

Australia, Jamaica, the United States and Canada, which proved very successful financially. On his return he continued to play in London and the provinces until a short time before his death. He inherited little of his father's genius, and his success was largely due to effective staging.

Kean, EDMUND (1787-1833), the most brilliant tragic actor of his age in England. His parents were poor and connected in a low capacity with the theatrical profession. At two years of age he was placed in a pantomine, at seven he went to school, but ran away, and for a short time he was cabin boy in a vessel. Returning to the stage, he ultimately obtained an engagement at one of the minor London theaters. For some years he played chiefly in small towns, and he managed to please his country audiences as Hamlet and Cato, and at Windsor he gained the applause of the royal family in *Richard III*. In 1814 he appeared at Drury Lane as Shylock and Richard III. His success was sudden and unexampled, and it was equally great in other parts, including *Othello*, *Hamlet*, *Macbeth*, *Iago* and *Lear*. He made two tours of the United States and was well received for his art, though criticised for unbusinesslike and discourteous personal conduct.

Kearney, *kahr'ny*, NEB., the county-seat of Buffalo co., 125 mi. w. of Lincoln, on the Chicago, Burlington & Quincy and the Union Pacific railroads. The important industrial establishments are large cotton and flour mills, grain elevators, brickyards, bicycle and cigar factories, foundries, machine shops and other works. The city is the seat of the state industrial school for boys, a military academy and a normal institute, and it has a public library, a fine high school, a city hall, a courthouse and an opera house. Other features of interest are a bridge across the Platte, over a mile long, and Lake Kearney, covering forty acres. The place was settled in 1871 and was incorporated as a village the next year. Population in 1900, 5634.

Kearny, N. J., a town in Hudson co., on the Passaic River, opposite Newark, and on the Erie and other railroads. It is a residence suburb of New York and Newark and has important manufactures of linoleum, thread, roofing, novelties and other products. A state soldiers' home, a Roman Catholic protectory and an Italian orphan asylum are located here. The place was settled by the Germans, who called it New Barbadoes. Later it was included within

the limits of Harrison, until it was separately incorporated in 1871. Population in 1905, 13,601.

Kearny, PHILIP (1815-1862), an American soldier, born in New York City. He graduated at Columbia College in 1833, studied law, entered the army in 1837 and two years later went to France to study the tactics of the French cavalry. While abroad, he served in the French army in the Algerian War, and in 1840 he was made aid to General Macomb, general in chief of the United States army, and was on the staff of General Scott, his successor, from 1841 to 1845. Kearny took an active part in the Mexican War, fought in an indian campaign in 1857, resigned, entered the French army and served with distinction in the Italian war, receiving the cross of the Legion of Honor, but returned to America in 1861. He reenlisted in the Union army and was killed at Chantilly in September, 1862.

Kearsarge, keer sahrj', THE. See ALABAMA, THE.

Keats, keets, JOHN (1795-1821), an English poet, born at Moorfields, London. From 1803 to 1810 he was at a school at Enfield, and at the close of that term he was apprenticed to a surgeon. Although he was a fairly good surgeon, he found the work very much against his inclinations, which were all toward the beautiful and fanciful, and he gave up the profession that he might devote himself to study, preparatory to a literary career. His first volume of poems came out in 1817; *Endymion* appeared in 1818; his last volume of poetry, containing *Lamia*, *Isabella*, *The Eve of Saint Agnes*, *Hyperion* and other poems, appeared in 1820. By this time he had become so ill of consumption that he was advised to seek a warmer climate; but it was too late, and though he reached Rome he survived only a short time. Shelley honored his memory by his elegy *Adonais*.

Keats's first volume of poems attracted little attention; the second, while it met with some favorable notice, was most severely criticised in *Blackwood's Magazine* and *The Quarterly Review*, and to the effects of this harsh treatment on a sensitive nature, Shelley in *Adonais* attributed Keats's early death. It is on his third volume that the fame of Keats rests, and the delicate, often faultless beauty of these poems entitles him to rank with the foremost of British poets. According to his conception, philosophy, politics, ethics had no place in poetry, which should concern itself merely with beauty.

And the beauty to the worship of which Keats gave himself was not spiritual beauty, but the highest type of sense-impressions. In description of form, color, perfume, Keats has never been surpassed.

Ke'ble, JOHN (1792-1866), an English divine, born at Fairford. He was educated by his father at home till the age of fifteen, when he was elected to an open scholarship at Corpus Christi College, Oxford. Here he gained a first class in mathematics and classics, was elected Fellow of Oriel College and gained in 1812 the English and Latin prize for essays. He was ordained deacon in 1815, priest in 1816 and was tutor in his college, 1818-1823, after which he went to Oxford to assist his father. From 1831 to 1841 he was professor of poetry at Oxford. He had previously published *The Christian Year; or Thoughts in Verse for the Sundays and Holidays Throughout the Year*, which had great influence, especially after he became identified with the Tractarian movement. He was noted for his saintliness, for his love of home life, for his reverence for children, for his dutiful devotion to his parents as well as to the Church, and for his generosity to his friends. Among his published works are *Lyra Innocentium*, *Thoughts in Verse on Christian Children*, besides theological pamphlets and sermons. Keble College, Oxford, built after his death, is a monument to his memory.

Keckskemet, kech'ke mate, one of the largest market towns of Hungary, 50 mi. s. e. of Budapest. It has an extensive trade in horses and cattle and is famous for its annual cattle fair. Population in 1900, 57,812.

Kee'ley, LESLIE (1836-1900), an American physician, born in Saint Lawrence County, N. Y., and educated at Rush Medical College, Chicago. During the Civil War he was an army surgeon. After this he located at Dwight, Ill., and during his practice he discovered a preparation for curing those addicted to the use of alcohol and opium. In 1880 he opened a sanitarium at Dwight for this purpose, and such was the success of this method that numerous other sanitariums were established throughout the Union. While his treatment was in many cases successful, its continuous use showed that it was not as effective as Doctor Keeley supposed it would be.

Keene, N. H., the county-seat of Cheshire co., 43 mi. w. of Manchester, on the Ashuelot River and on two lines of the Boston & Maine railroad. The city contains railroad repair

shops, sash and blind factories, furniture and other wooden-ware plants, a pottery, a shoe factory, a woolen-mill and other works. It is located on a plain surrounded by high hills. The place was settled in 1734 and was known as Upper Ashuelot until its incorporation under the present name, in 1753. The city was chartered in 1874. Population in 1900, 9165.

Keene, LAURA (about 1820-1873), the stage name of an English-American actress whose real name was Miss Mary Moss. She first achieved success in London, in 1851, as Pauline in *The Lady of Lyons*. In the following year she visited the United States and Australia and in 1855 opened a theater in New York City. In 1858 she produced *Our American Cousin*, among the supporting actors being Joseph Jefferson and E. H. Sothorn. It was during the presentation of this play that President Lincoln was assassinated in Ford's Theater at Washington, in 1865.

Keewatin, *kee wah'tin*, a large Canadian territory under the jurisdiction of Manitoba, stretching from Manitoba to the Arctic Ocean and from Mackenzie and Saskatchewan to Hudson Bay. It is 1300 miles long and has an area of 756,000 square miles. The rivers in this territory are the Severn, the Nelson, the Back and the Churchill. The southern portion contains dense and valuable forests of spruce, pine and aspen poplar. Gold and copper have been found. Population in 1901, 8546.

Keller, Helen ADAMS (1880-), an American writer. An attack of scarlet fever destroyed the senses of sight and hearing when she was but nineteen months old. When she was seven years old Miss Anna Sullivan was secured as her teacher, and the child's progress was extraordinary. She learned to read, write and talk with her fingers and finally to speak. After studying in a Cambridge school, she entered Radcliffe College in 1900. She has published *The Story of My Life*.

Kellogg, CLARA LOUISE (1842-), an American soprano, born at Sumpterville, S. C. She was educated in New York, but made her debut in London and appeared with great success in many tours of Europe and America.

Kelp, in commerce, the crude alkaline substance obtained by burning seaweeds, which themselves are known as kelp. When salt was dear, the bulk of soda used in soap making was obtained from kelp and barilla; but since soda can be more cheaply manufactured from salt, kelp burning has ceased to be a flourishing industry. Kelp is now chiefly used in the production of iodine and chloride of potassium.

Kelvin, LORD. See THOMSON, WILLIAM, Sir, Lord Kelvin.

Kemble, FRANCES ANNE (1809-1893), popularly known as Fanny Kemble, an English writer and actress, eldest daughter of Charles Kemble and niece of Mrs. Siddons. She was induced to appear on the stage in 1829 at Covent Garden as Juliet, and her success in this rôle was followed by successes as Portia and as Lady Teazle. Her trip to America in company with her father was also a splendid triumph. She returned to London in 1847, and from that time she resided alternately in America, England and on the Continent, appearing at intervals as a public reader. She wrote the tragedy *Francis the First*, *Records of a Girlhood* and *Poems*.

Kemble, JOHN PHILIP (1757-1823), an eminent English actor. Being intended for the church, he was sent to the Roman Catholic college of Douay, France; but, in spite of his parents' opposition, he selected the stage as a profession, made his first appearance at Drury Lane in 1783 and became at once popular. From 1801 to 1803 he made a most successful tour in France and Spain, and on his return to London he purchased a share in the Covent Garden Theater and made himself a splendid reputation in the characters of Julius Caesar, Hamlet, Macbeth, Riche-lieu and Coriolanus. He abandoned the stage in 1817 and received many tokens of esteem from his numerous admirers on that occasion. His acting was distinguished for dignity and precision, but lacked fire and pathos.

Kendal, MRS. (1849-), the stage name of Mrs. Margaret (Madge) Robertson Grimston, a distinguished English actress. She was born of a theatrical family and in childhood took juvenile rôles. In 1865 she made her formal debut as Ophelia. In 1869 she was married to W. H. Grimston (Mr. Kendal), with whom she afterward acted. She attained notable success in both Europe and America in Sardou's *Diplomacy*, Shakespeare's *As You Like It* and some lighter modern comedies.

Kendall, AMOS (1789-1869), an American politician, born at Dunstable, Mass. He graduated at Dartmouth in 1811, and several years afterward he was a tutor in the family of Henry Clay, in Kentucky. There he was admitted to the bar and became a warm supporter of Andrew Jackson, whose cause he espoused in the *Frankfort Argus*. After Jackson's election to the presidency, Kendall became one of the leading figures in the famous "Kitchen Cabinet" (See KITCHEN CABINET), and as such he did much to

shape the policies of the administration. He became postmaster-general in 1835 and retained the office through most of Van Buren's term. Later he edited several newspapers and finally invested with Samuel F. B. Morse in telegraph patents, which returned him a large fortune. In the last years of his life he devoted himself to philanthropy. He was a warm supporter of Lincoln during the war, but still wished to be known as a Jacksonian Democrat.

Ken'esaw Mountains, BATTLE OF, an important battle of the Civil War, fought near Marietta, Ga., June 27, 1864. General Sherman with a force of about 95,000 Federals had begun his march from Chattanooga to Atlanta and had compelled the Confederates, 60,000 strong, under Gen. Joseph E. Johnston, to retreat before him. The latter, however, had taken up a strong position on Kenesaw Mountain, and there successfully met the determined assault led by Logan and McCook, the latter being killed. The loss of the Confederates was 700, and that of the Federals, 3000. Soon after the battle, Sherman succeeded in turning Johnston's position and later retired still farther southward.

Ken'ilworth, a town of England, in Warwickshire, 4 mi. n. of Warwick. Kenilworth Castle, now a magnificent ivy-covered ruin, was founded in the reign of Henry I. The gorgeous entertainment given here in 1575 to Queen Elizabeth by the earl of Leicester, to whom the castle was presented, is familiar to all, from Scott's romance of *Kenilworth*. Population in 1901, 4544.

Ken'nan, GEORGE (1845-), an American traveler and writer, born at Norwalk, Ohio. He was educated in the common schools, studied telegraphy and became an operator on the lines of the Russo-American Telegraph Company in Kamtchatka and Siberia. He returned to the United States, but in 1870 continued his explorations in Russia. In 1885 and 1886 he investigated the convict and exile system of Siberia, making a journey of 15,000 miles. Later he embodied his experiences and conclusions in many magazine articles, books and lectures. He was expelled from Russia in 1901, while making further investigations. Kennan served as special war correspondent for New York papers during the Spanish-American and Russo-Japanese wars.

Ken'nebec, a river of Maine, rises in Moosehead Lake and after a course of 150 miles, mostly in a southerly direction, empties into the Atlantic, 12 mi. below Bath. Its chief tributary is the

Androscoggin. The Kennebec has falls at various points in its course, one being at Augusta, where a dam has been built. It is navigable for ships as far as Bath and for steamers to Hallowell, 40 miles. Along its banks are the cities of Bath, Augusta, Waterville and Hallowell.

Keno'sha, WIS., the county-seat of Kenosha co., 34 mi. s. of Milwaukee, on Lake Michigan and on the Chicago & Northwestern railroad. The city has a fine harbor, with an increasing trade, and the manufactures include flour, hosiery, leather, typewriters, lamps, carriages, furniture and various machine-shop products. It contains the Kemper Hall School and Simmons Memorial Library. The place was first incorporated in 1841. Population in 1905, 16,235.

Kent, JAMES (1763-1847), an eminent American jurist, born at Fredericksburg, N. Y. He was educated at Yale College, and was admitted to the bar in 1785. He became professor of law at Columbia College and rose to be chancellor of New York (1814-1823). His *Commentaries on American Law*, published between 1826 and 1830, at once became a standard work and have had a great influence upon American legal practice and legislative principles.

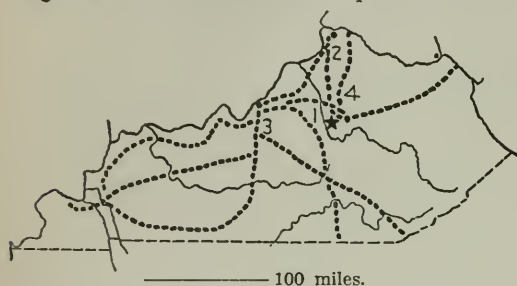
Kent'on, OHIO, the county-seat of Hardin co., 55 mi. n. w. of Columbus, on the Scioto River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Erie and other railroads. The city is in a farming region and has lumbering interests and manufactures of iron, hardware, tools and other articles. There is a public library, and the other important buildings are the courthouse, the city hall, the county jail and the armory. The place was settled in 1833 and was incorporated in 1885. Population in 1900, 6852.

Kenton, SIMON (1755-1836), an American frontiersman and indian fighter, born in Virginia of Scotch-Irish parentage. He received but a limited education and in 1771 went to the head waters of the Ohio, where he became an indian trader. He attained distinction in the frontier warfare of Ohio and Kentucky, under Daniel Boone and George Rogers Clark, accompanying the latter upon his famous expedition to Kaskaskia in 1778. He was several times a prisoner among the indians and suffered terrible tortures. At the end of the war he settled at Maysville, Ky., but took part in Wayne's campaign in 1793 and in the indian campaign of the War of 1812.

Kentuck'y, the BLUEGRASS STATE, one of the central states, bounded on the n. by Illinois, Indiana and Ohio; on the n. e. by West Virginia;

on the s. e. by Virginia; on the s. by Tennessee, and on the w. by Missouri and Illinois. The Ohio River forms the north boundary line, which is very irregular, and the Sandy River separates the state from West Virginia. The greatest length from east to west is about 500 miles, and from north to south, about 180 miles. The area is 40,400 square miles, of which 400 square miles are water. Population in 1900, 2,147,174, of which 284,706 were colored.

SURFACE AND DRAINAGE. Kentucky is divided into a number of distinctly marked physical regions. The eastern and southeastern parts of the state are crossed by parallel ranges of the Appalachian Mountains. The summits of these seldom exceed 3000 feet, but a number of the ranges are unbroken and are separated from



1, Frankfort; 2, Newport; 3, Louisville; 4, Lexington. Dotted lines indicate chief railroads.

each other by deep, even valleys. This portion of the state is quite heavily timbered with a number of varieties of hard wood. Descending across the state from the northeast to the southwest and bordering upon the region already described is a region diversified by numerous conical sandstone hills, which rise from 1200 to 1300 feet above sea level. The peculiar appearance of this region has caused it to be named the *Knobs*. The Knobs extend along the southern boundary near the central portion of the state for a number of miles, and another branch extends northerly and northwesterly to the Ohio River. Lying between the branches of the Knobs and extending from the most northerly point in the state somewhat more than half-way to the southern boundary, is the celebrated blue grass region. To the west of this is an area of slightly diversified country, underlaid with thick formations of limestone, in which are found Mammoth Cave, near the central part of the state (See MAMMOTH CAVE), and numerous other caverns of less note. To the west and north of a portion of the limestone region is

found a hilly section, closely resembling in its appearance and structure the southern portion of Indiana and Illinois, and the southwestern part of the state also bears a very close resemblance to this region.

The general slope of the state is toward the north and northwest, and all of the rivers flow into the Ohio or the Mississippi. Some of these streams have worn deep channels through the hills and low mountains which they have crossed. A number of them are important because of their size. Passing from west to east, these rivers, in the order of their occurrence, are the Tennessee, the Cumberland, the Green, the Kentucky and the Licking. The Tennessee and the Cumberland are navigable across the state, and the Green, the Kentucky and the Licking are navigable through the lower parts of their courses; previous to the construction of railway lines they formed important outlets to the Ohio River. There are no lakes of importance.

CLIMATE. The climate of Kentucky is warm-temperate, equable and healthful. The mean annual temperature is about 55°. In summer the thermometer may reach 100°, and the average temperature for July is 78°. The winters are warm, having an average of 35°, and there is but little snow. The average rainfall is about 40 inches in the entire state.

MINERAL RESOURCES. The eastern and southeastern portions of the state are underlaid with coal measures, which have an area of about 9000 square miles and yield an excellent quality of bituminous coal. Another coal region having an area of about 4000 square miles is located in the northwestern part of the state and is a continuation of the coal fields of Illinois and Indiana. Though of smaller area than the eastern region, this produces a larger quantity of coal, due mainly to its greater transportation facilities. Iron ore is found in the coal regions, but it has not yet been extensively mined. Other minerals of some importance are natural gas, occurring in several counties, and petroleum, found in the south central part of the state. In 1905 a pipe line was laid from the Menifee County gas field to Lexington, through which natural gas is supplied in abundance to this city. Limestone, salt, and clay suitable for brick and tile and for pottery are found in various localities.

AGRICULTURE. The soil and climate of most regions are admirably adapted to agriculture. The counties along the Ohio engage quite extensively in raising fruit. The blue grass region is devoted to stock raising and has attained more

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than a national reputation for its fast horses and excellent breeds of cattle. Mules are also raised in large numbers for the southern market. The leading crops are tobacco, corn, wheat and hemp. Rye and potatoes are also important crops. In the production of tobacco Kentucky leads all other states, producing from one-third to one-half of the crop grown in the country.

MANUFACTURES. The manufacture of tobacco is the leading manufacturing industry. This is followed in importance by meat packing, the production of iron and steel, the manufacture of alcoholic and malt liquors, lumbering, manufacture of flour and grist mill products, and slight industries of lesser magnitude, including the manufacture of woolen and cotton goods, furniture, carriages and machinery. The manufacturing industries center in and about Louisville.

TRANSPORTATION AND COMMERCE. In most parts of the state the carriage roads are fairly good. The state contains over 3000 miles of railway, but it is too far south to receive benefit from the great east and west trunk lines. There are a number of lines extending across the state from north to south; these are connected by cross lines, and some of them contain spurs extending into the most fertile regions. A number of counties in the eastern part of the state and in the south central region are wholly without railway communication, and as a whole the railway lines are inadequate to the needs of the state. The Ohio and its largest tributaries, the Tennessee, the Cumberland, the Green and the Licking, furnish important waterways.

The state has but very little direct foreign commerce. The exports are hemp, flax, tobacco and live stock, while the imports consist of manufactured articles and various food products. Louisville is the chief commercial point.

GOVERNMENT. The legislature consists of a senate of 38 members, elected for four years, and a house of representatives of 100 members, elected for two years. The legislature meets biennially, and the session is limited to sixty legislative days. The executive department consists of a governor, a lieutenant governor, a treasurer, an auditor of public accounts, a register of land office, a commissioner of agriculture, labor and statistics, a secretary of state, an attorney-general and a superintendent of public instruction, each elected for a term of four years; they are ineligible for reelection at the succeeding term. The judicial department culminates in a supreme court, known as the

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court of appeals, comprising from five to seven judges, each elected from a district for a term of eight years. The lower courts are the circuit courts, county courts and justice courts. The circuit courts consist of courts in each district into which the state is divided, and they are presided over by a judge who is elected in the district for a term of six years. The local affairs are administered by county and magisterial district officers.

EDUCATION. Separate schools are provided for white and colored pupils. The larger towns and cities have excellent systems of graded schools, but the rural schools labor under the disadvantages common to all rural communities, having a small number of pupils and finding it difficult to raise a sufficient sum by taxation to continue the schools more than six months each year. As one of the older states, Kentucky was unable to profit by public lands which have been so beneficial in aiding the school systems of newer states. The state college at Lexington, which includes the agricultural and mechanical college, is at the head of the public school system and admits pupils who have completed the prescribed school course. There is also a state normal school at Frankfort, which is devoted to the preparation of teachers for colored schools. These institutions are supplemented by numerous colleges and secondary schools maintained by various denominations. Among the most important of these are Kentucky University at Lexington, Berea College at Berea, Central University at Danville, Georgetown College at Georgetown and Williamsburg Institute at Williamsburg.

INSTITUTIONS. The state school for the blind is at Louisville, the school for the deaf is at Danville and the institution for feeble-minded children at Frankfort. The insane asylums are at Lexington, Hopkinsville and Anchorage, and the penitentiaries are at Frankfort and Eddyville.

CITIES. The chief cities are Frankfort, the capital; Louisville, Covington, Newport, Lexington, Paducah, Owensboro, Henderson and Bowling Green, each of which is described under its title.

HISTORY. Kentucky was probably first visited by Dr. Thomas Walker in 1750, but it was not settled until 1774, when James Harrod planted a colony at Harrodsburg. Meanwhile, Daniel Boone had led exploring expeditions into the region and in 1775 established Boonesborough. Virginia claimed the territory until 1790, when the Virginia legislature passed an act allowing

separation, and this was accepted by a convention of the citizens of Kentucky. For many years, however, a strong sentiment in favor of the creation of an independent state had been growing and had been fostered by a land company known as the Transylvania Company, headed by Richard Henderson. The state was admitted to the Union June 1, 1792, and Isaac Shelby was elected first governor. Kentucky took a prominent part in the War of 1812, her great leader, Henry Clay, being a conspicuous member of the war party. It also was honorably represented in the Mexican War. In the Civil War she at first attempted to maintain her neutrality, though slaves were held in the state and her inclinations were naturally with the South. The Union armies, however, soon were in possession, and the state was saved to the Union. It was the scene of important battles, including those of Mill Spring, Richmond and Perryville. Forty thousand Kentuckians fought for the Confederacy during the war. The state was Democratic in both national and state politics almost continuously after the Civil War.

Consult N. S. Shaler's *Kentucky*, in the American Commonwealth Series.

Kentucky and Virginia Resolutions, a series of resolutions adopted by the Kentucky and Virginia legislatures in 1798 and 1799. Those adopted by Kentucky were nine in number, were probably written by Jefferson and contained radical denunciation of the Alien and Sedition Laws, besides a protest and warning against the assumption by the Federal government of powers belonging to the states. In 1799 the legislature passed a resolution declaring the right of a state to nullify any Federal law which it deemed unconstitutional.

The resolutions passed by the Virginia legislature in December, 1798, were eight in number, were probably written by James Madison and were much milder in their expression. However, they contained the same principles. The two sets of resolutions were sent to the executives of all the states, and replies were received from many. All were unfavorable to the principles expressed in the resolutions.

Kentucky River, a river in the State of Kentucky, rises in the Cumberland Mountains, traverses the state in a northwesterly direction and after a winding course of 260 miles flows into the Ohio at Carrollton. By a series of improvements, the lower portion has been rendered continuously navigable for steamers.

Kentucky University, an institution of higher learning at Lexington, Ky., founded at Georgetown in 1837. It comprises, besides the College of Liberal Arts and College of the Bible, the commercial college, and the medical department at Louisville. The attendance is about 1200, and the faculty numbers about seventy.

Ke'okuk, IOWA, one of the county-seats of Lee co., 160 mi. s. e. of Des Moines, on the Mississippi River at the mouth of the Des Moines River, and on the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Wabash and other railroads. A canal eight miles long has been constructed by the Federal government around the rapids in the Mississippi, which are just above the city. The city contains lumber mills, powder works, canning and pickle factories, a poultry packing plant, and stove, shoe and other factories. The surrounding region is a fertile agricultural section, and there is a valuable trade in farm products. The Indian chief Keokuk, after whom the place was named, is buried in Rand Park. A bridge crossing the Mississippi River here is more than 2000 feet long. The city has a national cemetery, a public library, a medical college and a large dental college. Keokuk was incorporated in 1848. Population in 1905, 14,604.

Kepler, JOHANN (1571-1630), a celebrated German mathematician and astronomer, friend and companion of Tycho Brahe. After the death of Tycho, Kepler continued his work alone and was appointed imperial mathematician and astronomer (See KEPLER'S LAWS). The latter part of his life was chiefly passed at Linz, as professor of mathematics. Kepler wrote much, but the work that has rendered him famous is his *New Astronomy, or Celestial Physics delivered in Commentaries on the Motions of Mars*.

Kepler's Laws, in astronomy, three laws discovered by Kepler, on which were founded Newton's discoveries, as well as the whole modern theory of the planets. They are:

- (1) Every planet describes an ellipse, the sun occupying its focus.
- (2) The radius vector of each planet (line joining the center of the sun with the center of the planet) sweeps over equal areas in equal times.
- (3) The squares of the periodic times (the periods of complete revolution round the sun) of two planets are proportional to the cubes of their mean distances from the sun.

These laws enabled Newton to determine the laws of the attraction of gravitation.

Kerosene, *ker o seen'*, an illuminating oil made by distilling crude petroleum. Kerosene has a strong, disagreeable odor and a slightly yellowish color. It is the most valuable product of petroleum and is extensively used for lighting houses and for cooking and heating purposes. The United States and Russia produce the largest quantities of kerosene. The name was first applied to oil distilled from coal in 1846. See PETROLEUM.

Ker'shaw, JOSEPH BREVARD (1822-1894), an American soldier, born at Camden, S. C. He was admitted to the bar in 1843 and was elected to the South Carolina senate some years later. At the opening of the Civil War he enlisted in the Confederate army, became a brigadier general and fought in the Peninsula Campaign, at Fredericksburg, at Gettysburg and at Chickamauga, in all of these battles serving with valor and ability. He later commanded a division at the Wilderness, Spottsylvania and Cold Harbor and served against Sheridan in the Shenandoah campaign of 1864. His force was captured April 6, 1865, when he returned to South Carolina and again entered the legislature. Later he became judge of the circuit court, a position which he held until 1893.

Kes'trel or **Windhover**, a species of falcon widely distributed over Europe, some parts of Asia and northern Africa. The kestrel is closely related to the American sparrowhawk, which it resembles in size, color and habits. The color is red above, buff and fawn beneath, everywhere marked with black, with bluish-gray feathers on the head and rump. The female is usually a rusty brown. The kestrel is a strong flyer and is able to hover over one spot for a long time, by means of the movement of its wings. When holding itself in this position it keeps its head to the wind, and because of this it is sometimes called the windhover. It feeds on mice and insects and can be trained to capture small birds. It occupies nests that have been deserted by crows and other birds, and it also builds in old towers and buildings.

Ketch'up or **Cat'sup**, said to be derived from the Japanese *kitjap*, a pungent sauce first introduced from the East and employed as a seasoning for gravies, meat and fish. It was formerly prepared from mushrooms only, but numerous other products are now used for the same purpose. The best ketchup is obtained from mushrooms and walnuts.

Kew, a small village in England, situated on the Thames, 1½ mi. n. e. of Richmond. It con-

tains the most noted botanical gardens of England and possibly of the world. In connection with these are a number of conservatories, three museums and a winter garden; also, a gallery containing a large collection of paintings of tropical flowers.

Kewanee, *ke wah'nee*, ILL., a city in Henry co., 50 mi. n. w. of Peoria, on the Chicago, Burlington & Quincy railroad. It is in an agricultural region, has coal mines in the vicinity and has become an important manufacturing center. It is the seat of extensive iron works and manufactories of agricultural implements, steam heating apparatus, pumps, gloves, mittens and other articles. Population in 1900, 8382.

Key, *kee*, FRANCIS SCOTT (1780-1843), author of *The Star-spangled Banner*. He was born in Maryland, practiced law at Frederick City and at Washington and became district attorney for the District of Columbia. It was during the British invasion in 1814, at the attack on Baltimore, which he witnessed as a prisoner in an English man-of-war, that Key wrote the words which have kept his name alive.

Keyes, *keez*, ERASMUS DARWIN (1810-1895), an American soldier, born at Brimfield, Mass. He graduated at West Point in 1832, and from that time until the Civil War he was on garrison duty on the frontier. At the opening of the war he was made brigadier general of volunteers, took part in the first Battle of Bull Run and in the Peninsula Campaign, but resigned in 1864 and removed to California, where he entered upon a mercantile career.

Key West, FLA., the county-seat of Monroe co., on Key West Island, which is the most westerly of the Florida Keys, at the southern extremity of Florida, about 90 mi. n. by e. of Havana, Cuba. The mild climate and pure air have made it a popular winter and health resort. The harbor is defended by Fort Taylor, at the entrance, and there are two lighthouses. It is on a number of steamship lines and has a considerable trade in fish, fruit, vegetables, turtles, salt, tobacco and other goods. The manufacture of cigars, mostly by Cubans, is the principal industry, while sponge fishing is also of considerable importance. The city has a naval station, with docks, machine shops, a marine hospital and barracks. The principal educational institutions are the Methodist Seminary and the Holy Name Academy. Other interesting features are the courthouse, the Federal building, the city hall, a convent, the public library and the Martello towers. Key West was settled in 1822

and was chartered as a city ten years later. It was a place of considerable importance to the navy during the Civil War and also in the war with Spain. Population in 1900, 17,114.

Khaibar, *ki'bur*, **Pass**. See **KHYBER PASS**.

Khamsin, *kahm seen'*, the name of a warm wind, or sirocco, which blows over northern Africa in the early spring. The word means *fifty*, and this name is given the wind because it is usually of fifty days' duration. The kham-sin is a high, hot wind and often fills the air with dust. It follows the southward movement of the tropical belt of high barometric pressure.

Khan, *kahn*, a title given by Eastern nations to princes, commanders and governors. It is now generally reserved for governors of cities and provinces.

Kharkov, *kahr koje'*, a city of Russia, capital of a government of the same name, located about 420 mi. s. w. of Moscow. Its most important institution is the university, which has about 1500 students. There are also various other educational institutions. The city has a large trade and has manufactures of cigars, tobacco, spirits and sugar. Population in 1900, 197,405.

Khartum or **Khartoum**, *kahr toom'*, the capital of Egyptian Sudan, on the left bank of the Blue Nile, near its junction with the White Nile, and on the Cape-to-Cairo railway. There are several mosques, Christian churches, government buildings and barracks here. Khartum is the emporium of a large trade, ivory, gums, ostrich feathers and senna being exchanged for European goods. Slaves are also bought and sold. It was made the seat of the governor-general of the Egyptian Sudan in 1850, and since that time it has grown in commercial importance. In 1885 it was taken by the Mahdi, who massacred the whole British garrison, including their gallant commander, General Gordon. In 1898 it was again captured by Lord Kitchener, who overthrew the Mahdi. Population, 14,023.

Khiva, *ke'vah*, a khanate of central Asia, a vassal state of Russia, though it is practically independent. Its manufactures are unimportant. Trade is now being rapidly developed by Russian influence, especially by the Caspian-Bokhara railway. Population, estimated at 800,000. The capital, Khiva, lies on an alluvial flat at the junction of two canals, 50 mi. w. of the left bank of the Amu.

Khorsabad, *kor sa bahd'*, a small village in Assyria, about 235 mi. n. of Bagdad. The village is near a mound which was formed by

the ruins of a suburb of ancient Nineveh. Excavations here have revealed the walls of a large palace built by Sargon about 700 B. C. In connection with these ruins numerous pieces of statuary and other works of art have been obtained and removed to the Louvre in Paris.

Khyber Pass or **Khaibar**, *ki'bur*, **Pass**, a famous pass in the northeast corner of Afghanistan, the chief gate between that country and India. The pass is 30 miles long, and though of considerable width in some places, it is in others not more than 20 feet wide. It is fortified and has been of great military importance during the various Afghan wars. It is under the control of the government of India.

Kiao-Chau or **Kiao-Chow**, *kyah'o chow'*, a walled city of China, situated on the south coast of the peninsula of Shan-tung and on the bay of the same name. In 1898 it was made the administrative center of the German protectorate in this part of China. Formerly it was a place of considerable commercial importance, but the filling up of its harbor transferred most of its trade to another port. Its occupation by the Germans was caused by the murder of two German missionaries in 1897, and in settling this affair with the government Germany obtained an extended lease of the place.

Kick'apoo, an indian tribe now numbering less than 1000, living on reservations in Kansas and Oklahoma. After the Illinois were driven away, the Kickapoo moved south from their home in central Wisconsin and were consistently the friends of the English, though after the close of the War of 1812 they peacefully gave up their lands to the United States.

Kidd, **WILLIAM** (about 1650-1701), a celebrated pirate, known as Captain Kidd. He was originally a shipmaster of New York, and in 1696 he was appointed captain of the ship *Adventure*, of thirty guns, for the suppression of piracy. He collected about one hundred fifty recruits, sailed for the East Indies, took to pirating in the Indian Ocean and returned with his booty to New York in 1698. He was arrested and arraigned in England for piracy, but the charge could not be proven. He was, however, tried for the murder of one of his crew, sentenced and hanged. The myth that he buried immense treasure on the shores of Long Island Sound or the banks of the Hudson River gave rise to one of Edgar Allan Poe's tales, *The Gold-Bug*.

Kid'napping, the act of getting forcible and illegal possession of and carrying away a person; an offense of varied degree, but always punish-

able by fine or imprisonment. The act may be committed against either children or adults, but must always be either against their will or with consent fraudulently obtained. In the case of children, valid consent in the sight of the law cannot be obtained.

Kidneys, *THE*, in man, two in number, are situated one on each side of the spinal column and extend downward from the eleventh rib. The right kidney is a little lower than the left, owing to the position of the liver. The kidneys are about 4 inches long, $2\frac{1}{2}$ inches broad and $1\frac{1}{2}$ inches thick, and each weighs about $4\frac{1}{2}$ ounces. They are shaped somewhat like a bean, are reddish in color, are composed of a dense substance that is easily crumbled and are abundantly supplied with blood by the renal artery, a branch of the aorta. A corresponding renal vein carries the returning blood to the ascending vena cava. The function of the kidneys is to take the urea from the blood that circulates in the capillaries around them. The urea is made in the liver, and the health of a person depends upon its being carried out of the system. The urine is carried by the ureters to the bladder, where it is held until expelled from the body. For diseases of the kidneys see BRIGHT'S DISEASE; CALCULUS; GOUT.

Kieft, *keeft*, WILLEM (?-1647), a Dutch colonial governor in America. He arrived in March, 1638, and immediately displayed a haughty and tyrannical spirit, which aroused the enmity of the people of New Netherlands. His cowardly and deceitful policy against the indians resulted in a war of extermination, the desolation of the colony and the massacre of hundreds of settlers. As a result he was obliged to admit the colonists to a share of the government, through a "council of twelve." In 1647 Kieft was superseded by Peter Stuyvesant and sailed for England, but the vessel was wrecked and Kieft was drowned.

Kiel, *keel*, a town of Prussia, in the Province of Schleswig-Holstein, 53 mi. n. n. e. of Hamburg. It is the most important naval station of the German Empire. The chief industry is shipbuilding, but Kiel has also iron foundries, engineering works, oil mills, tanning works and tobacco works. A great ship canal now connects the town with the Elbe (See KAISER WILHELM CANAL). Population in 1900, 107,977.

Kieserite, *kee'zur ite*, a sulphate of magnesia, obtained at Stassfurt and elsewhere and employed

as a source of Epsom salt, as well as in the manufacture of fertilizers. See EPSOM SALT.

Kiev, *ke'yef*, a city of Russia, capital of the government of the same name, situated on the Dnieper, 670 mi. s. of Saint Petersburg. The city is divided into three parts—old Kiev; the commercial quarter, Podol, and the portion which contains the old fortifications, known as Petchersk. In the early years after the introduction of Christianity into Russia, the city was the center of the new religion, and it contains many notable old ecclesiastical buildings. It has manufactures of tobacco, paper, chemicals and hardware, but its chief industries are the refining of beet sugar and milling and distilling. It has a good harbor, and its trade is extensive. Population in 1902, 319,000.

Kilauea, *ke'lah oo a'ah*, an active volcano in the east of the island Hawaii, on the eastern slope of the great volcano Mauna Loa, 30 mi. s. w. of Hilo. It has an oval crater, 9 miles in circumference, with a lake of red and boiling lava at the bottom, over 100 feet below the crater's mouth. The great eruptions of Kilauea were in 1789, 1823, 1832, 1840 and 1868.

Kilimanjaro, *kil'e man jah'ro*, a double peaked, snowclad volcanic mountain in German East Africa. The two peaks are Kibo and Mawenzi. Kibo is the higher, measuring 19,710 feet, and Mawenzi is 17,570 feet high. Vegetation is found up to 14,000 feet, and forests reach to 11,000 feet. The first ascent of the mountain was made by Hans Meyer, in 1889.

Killarney, *kil lah'ny*, a market town of Ireland, in the County of Kerry, 44 mi. w. n. w. of Cork, in the midst of beautiful scenery, within a mile of the celebrated lakes to which it gives its name. These lakes, three in number, are interspersed with wooded islands, and the lofty banks are also richly wooded. They are popular summer resorts and are visited annually by many tourists. Population of town, 5500.

Killdeer, a variety of plover common in America, named from its plaintive cry. See PLOVER.

Kiln, *kil*, a structure of brick or stone, used for drying, baking, burning, annealing and calcining various substances and articles, such as corn, hops, malt, cement, limestone, iron ore, glass, bricks and pottery. The construction of kilns naturally varies with the special object for which they are designed, but the same principle is involved in all, that is, the generation of ample and regular heat with a small expenditure of fuel.

Kil'ogram, a weight in the French or metric system, containing 1000 grams, or about 2.2 pounds in the English system. It is also called kilo.

Kil'ogramme'ter, a unit of measurement, expressing the mechanical work expended in raising a body whose weight is one kilogram (2.2046 pounds) through the vertical height of one meter (3.2809 feet). It is equal to 7.233 foot-pounds.

Kilpat'rick, HUGH JUDSON (1836-1881), an American soldier, born on a farm in New Jersey. He graduated from West Point in 1861 and took an active part in the Civil War as a cavalry leader, distinguishing himself particularly at the second Battle of Bull Run, at Gettysburg and with Sherman in his famous marches through Georgia and the Carolinas. He also achieved fame by a daring raid through Virginia in March, 1864. For his brilliant service he was promoted, through all grades, to be full major general in the regular army. He was minister to Chile in 1868 and again in 1881.

Kimberley, *kim'bur ly*, the capital of Griqualand West, Cape Colony, and the center of the South African diamond fields which were discovered in 1867 (See DIAMOND). It is connected by rail with Port Elizabeth and Cape Town, and its commerce is rapidly increasing. Kimberley was the scene of a long siege in the South African War. Population in 1904, 34,331.

Kindergarten, *kin'dur gahr'ten*, a school designed for the instruction of children between three and six years of age. The word means *child garden* and originated with the first school of this kind, which was established by Friedrich Froebel in 1840, in the village of Blankenburg, Prussia. Froebel's idea was to place the child amidst such surroundings as would assist in the right expression of every activity. His ideal school included a building fitted up into work rooms and play rooms, flower and vegetable gardens and suitable playgrounds.

The underlying principles of the kindergarten are to use every impulse, desire, hope, interest or purpose of the child in advancing his skill along all lines of self-activity; through play so to train the child that he will become familiar with the ordinary occupations of life; to teach the children to love one another and to be kind. These ends are secured by use of carefully selected objects, called *gifts*, and by songs and games. The gifts are eleven in number and were selected by Froebel with a view to giving expression to all of the child's different activities. They are

divided into five groups: (1) solids, (2) surfaces, (3) lines, (4) points, (5) construction material. The first gift consists of six colored balls about one and one-half inches in diameter, covered with different colored worsteds. The second gift is a wooden ball, a cylinder and a cube one and one-half inches in diameter. This is occasionally replaced by half-inch beads, stained in six colors. The third gift consists of eight wooden one-inch cubes, forming, when properly placed together, a two-inch cube. The fourth gift consists of eight wooden brick-shaped blocks, one-half by one by two inches, forming, when placed together, a two-inch cube. The fifth gift is twenty-seven one-inch cubes, three of which are bisected diagonally and three quadrisected diagonally. The sixth gift is twenty-seven wooden brick-shaped blocks, three being bisected lengthwise and six crosswise. The seventh gift consists of wooden tablets one inch in diameter. These consist of circles, half-circles, squares, half-squares, equilateral triangles, half-equilateral triangles and thirds of equilateral triangles. The eighth gift consists of sticks or splints from one to five inches long; the ninth gift is of wire rings, half-rings and quarter-rings of various lengths; the tenth is of natural objects containing points, such as pebbles, lintel seeds and the like. The eleventh consists of construction materials, such as softened peas, pellets of wax, cork cubes and sticks with sharpened ends. In addition to these gifts, material is supplied for occupations. The solid material consists of clay suitable for molding, sand, cardboard and wax. The surface material includes papers for folding into squares, oblongs, triangles and other forms, colored crayons and water colors. The linear material includes slats for basketry work; material for weaving, embroidering and for drawing; material for emphasizing points, such as beads, buttons, papers, and material for stringing and perforating.

The kindergarten is not a school for instruction, but one where all barriers between teacher and pupil are removed and where the greatest freedom prevails, though the activities of the children are so directed by the teacher as to secure the desired end. For best results, one teacher should not have charge of more than twenty children.

Kindergartens are now common throughout Germany, France, Switzerland, Austria, England, the United States, Canada, Argentina and some other South American countries. The work was



KINDERGARTEN, NEW ORLEANS, LOUISIANA

introduced systematically into the United States in 1870, and schools are now found in all large cities and many small ones, so that there are over 300,000 children receiving systematic kindergarten instruction. The Pratt Institute of New York, the Teachers' College, connected with Columbia University, the Workingman's Institute in New York and the Chicago Kindergarten College provide means for the thorough training of those who wish to engage in kindergarten work. The state normal schools in a number of states also maintain kindergarten departments and prepare kindergarten teachers. The American Froebel Union was organized in 1867 and included the kindergarten instructors of the United States. This organization continued to increase in numbers and in influence until, in 1885, it became the Kindergarten Department of the National Educational Association. See FROEBEL, FRIEDRICH. Consult Blow's *Kindergarten and Child Culture*; Froebel's *Education by Development and Education of Man*; Harrison's *The Kindergarten System* and *Froebel's Building Gifts*; Peabody's *Lectures to Kindergartners*; Wiggin and Smith's *Kindergarten Principles in Practice*.

Kinet'ic Theory of Gases. See Gas.

Kinet'oscope, an instrument for reproducing movable pictures from photographs and projecting them upon a screen. The pattern in most common use consists of a magic lantern with a strong light and an object glass and shutter, constructed specially for the pictures used. The pictures are photographs about an inch in diameter, arranged in succession on a long strip of celluloid film. This is attached to a rotating apparatus, which is operated by an electric motor or a belt and pulley and is unwound from one cylinder and wound upon another in such a manner as to cause the pictures to pass rapidly across the lens of the lantern. Each picture is exposed to view for about one-fiftieth of a second, and from fifty to sixty exposures a second are made. The opening shutter comes opposite to each picture as it falls upon the screen and then moves so as to shut off the light as the picture is changed. The time required for changing from one picture to another is about one-tenth the time given to the exposure upon the screen; hence the pictures succeed one another so rapidly that the impression of the first remains upon the eye until the next appears, thus producing a very lifelike effect. The kinetoscope is also called *vitascop*e. See MAGIC LANTERN.

King, the title of the supreme ruler of a tribe, nation or state. In the earliest times the king was absolute ruler and the source of all authority. He was considered the representative of God on earth, and his person was held sacred. But this conception of a king has gradually changed with the growth of the spirit of liberty, until most rulers are now restricted by constitutions; many are elective, that is, subject to removal by a body representing the citizens of a State. No king now holds supreme authority; he is only coördinate with the national legislature and the national courts. The kingship is hereditary in most States and generally descends to the oldest male heir, though in some countries it may fall to female descendants in the absence of male descendants. In European countries the king is usually subject to a certain qualification as to religious faith. Thus, in England the sovereign must be a Protestant, and in Austria-Hungary he must be a Roman Catholic. The old theory that a king can do no wrong still obtains in Europe, and, accordingly, responsibility for political action is usually placed in the hands of his ministers. The powers of the king in most European countries theoretically include appointment, military and naval command, the summoning, opening and adjourning of the parliament, the approval or disapproval of legislation, the direction of foreign affairs, the pardoning of criminals, the conferring of titles; but in reality most of these powers are delegated to the king's ministers.

King, CLARENCE (1842-1901), a noted American geologist and mining engineer, born at Newport, R. I., and educated at the Sheffield Scientific School, Yale. After graduation he became connected with the geological survey of California and gave most of his time during the next five years to the exploration of the high Sierras. He made the first survey of Yosemite Valley and discovered and named mounts Whitney and Tyndall. In 1867 he was placed in charge of the United States geological exploration of the fortieth parallel and gave five years to this work, which resulted in a complete geological and topographical cross section of the Rocky Mountains and Sierra Nevadas. In 1879 the geological surveys acting under the government were organized under one head and placed in charge of the department of the interior. Mr. King was made the first director. Among his writings are *The Age of the Earth and Systematic Geology*.

King, RUFUS (1755-1827), an American statesman, born at Scarboro, Maine. He graduated

King

from Harvard University and was admitted to the bar in 1780. He early entered politics, was elected to the legislature of the colony and was a delegate to the constitutional convention, being an earnest advocate of the instrument, especially in Massachusetts. In 1789 he was elected United States senator from New York and became a leader of the Federalists. In 1796 he was appointed minister to England, where he remained until 1803. He was twice thereafter elected to the United States Senate.

King, WILLIAM RUFUS (1786-1853), an American statesman, born in Sampson County, N. C. He was educated at the state university, was admitted to the bar and was elected to the state legislature in 1806. He was reelected in 1808 and in 1809 was sent to Congress, serving seven years. In 1819 he removed to Alabama and became one of the new state's first United States senators, serving continuously until 1844, when he was appointed minister to France. Returning at his own request in 1846, in 1848 he again became United States senator and in 1852 was chosen vice-president of the United States on the Democratic ticket with Franklin Pierce; but he was unable to enter upon the duties of the office on account of illness, which soon after caused his death.

Kingbird, a common drab-colored bird with white under parts and a patch of bright red



KINGBIRD

feathers on the top of its head; this it raises as a crest when angry, but it is ordinarily concealed. The kingbird is one of the tyrant flycatchers and is an exceedingly active, pugnacious bird; it defends its nest with vigor and skill. It has very keen sight, and even when sitting on its nest it keeps a sharp lookout for insects and, leaving its charge for a moment, catches them quickly

Kingfishers

on the wing. The kingbird is charged with eating bees and is consequently not favored by the bee raiser, though on the whole few birds are of greater assistance to the agriculturist. For the egg of the kingbird, see BIRDS, *color plate, Eggs*. Other nearly related species are called by the same name. The great-crested flycatcher, a near relative and a more showy bird, has a curious custom of weaving into its nest, wherever possible, one or more of the cast skins of snakes.

King Crab. See HORSESHOE CRAB.

Kingfishers, a family of birds distinguished by their long, stoutly formed, four-sided bills, which are broad at the base and terminate in a fine, sharp point; short legs, strong feet and somewhat elongated toes. The common kingfisher of Great Britain has a greenish head, back and neck, spotted with blue, and a bright blue



BELTED KINGFISHER

over back and rump. Its throat is white, and the under surface of the body is pale brown. The kingfisher spends most of its time perched on the bough of a tree overhanging the bank of a river. From this place it watches for fish, and as soon as it sees one, it dives into the water, secures the fish and returns to its former position, where it swallows it entire. This bird has long been recognized in poetry and is the subject of many superstitions. Many people believed that it laid its eggs in a nest and floated it out upon the sea, stilling the waves with its wings. It was then called the halcyon bird, and from its name beautiful days came to be known as *halcyon days*. In the United States the *belted kingfisher* is a bluish bird with white under parts, crossed over the breast with a bar of blue. In the female and young this blue band is bordered with chestnut. This bird nests at the end of a long tunnel, which the bird makes in the bank of a stream.

King George's War. See FRENCH AND INDIAN WARS.

King'let, a delicate little bird of the thrush family, olive-green above and yellowish below. Two species are common in the United States, the *golden-crowned kinglet*, which has a stripe of beautiful gold or orange through the middle of its head, and the *ruby-crowned kinglet*, which has a fiery red crest, hidden by grayish feathers, except in moments of anger or excitement. Both are common in the Northern states during the period of migration, and the ruby-crowned kinglet is one of the sweetest of the spring songsters.

King Philip (?-1676) or Metacomet, son of Massasoit, chief of the Wampanoags. Though Massasoit was a steadfast friend of the whites, his son had become suspicious of them and planned an outbreak which for a long time filled the colonies with burnings and massacres. Finally Philip was defeated and driven hither and thither; having taken refuge in a swamp near Mount Hope, he was slain by another indian.

Kings, BOOKS OF, two books in the English and one book in the Hebrew canon of the Old Testament. The history, as related in the books of *Kings*, begins with the close of David's reign and carries the events onward to the capture of Jerusalem and the destruction of the Temple. See CHRONICLES.

King's Evil. See SCROFULA.

Kings'ley, CHARLES (1819-1875), an English clergyman and author. He was educated at King's College, London, and afterward at Magdalen College, Cambridge, where he took his degree with high honors. Shortly after his graduation he was given the curacy of Eversley, and he was later made rector of the same parish. The condition of the English working people always interested Kingsley greatly, and he worked constantly for their improvement, both spiritually and materially. His opinions on the social and economic questions of the time are powerfully expressed in his earliest novels, *Alton Locke*, *Tailor and Poet* and *Yeast, A Problem*. In 1853 *Hypatia* was published, and in 1855 *Westward Ho*, both brilliant historical novels, the former dealing with the early Christian church, the latter with the South American adventures of the Elizabethan era. Among his other well-known works are *Two Years Ago*, *Hereward*, *The Hermits* and *The Water Babies*. He was appointed professor of modern history at Cambridge in 1859 and was canon of Chester in 1869.

Kingsley, HENRY (1830-1876), an English novelist, a brother of Charles Kingsley. Educated at King's College, London, and Worcester College, Oxford, he left England to become an Australian colonist, in 1858. On his return he contributed largely to magazines and reviews. Of the novels which he published between 1859 and 1874 *Geoffrey Hamlyn* was the first, while *Ravenshoe* and *Austin Elliott* are considered the best. He was also for a short time editor of the *Edinburgh Daily Review*.

Kings'mill Group. See GILBERT ISLANDS.

King's Mountain, BATTLE OF, a battle in the Revolutionary War, fought October 7, 1780, between a detachment of Cornwallis's army, under Ferguson, and a force of backwoodsmen, under a number of partisan leaders, including James Williams, Isaac Shelby and John Sevier. The British were posted at the summit of a steep mountain about a thousand feet in height, and thirty miles southwest of Charlotte, N. C., but the Americans stormed the position from all sides, inflicting a loss of nearly 400 men in killed and wounded and capturing the remainder of the British force.

Kings'ton, the capital of Frontenac co., Ontario, Can., on Navy Bay, at the northeast corner of Lake Ontario, 172 mi. s. w. of Montreal, on the Grand Trunk, the Kingston & Pembroke and the Bay of Quinte railroads. Queen's University and College, a collegiate institution belonging to the Presbyterians, a mechanics' institute, the Anglican and Roman Catholic cathedrals and a hospital are located here. About a mile west of the city is the Provincial penitentiary. Next to Quebec and Halifax, Kingston has the strongest fortifications in Canada. The trade is very considerable, and the harbor is accessible to ships of large size. There are breweries and manufactures of machinery, steam engines, cottons, leather and pianos. Shipbuilding is carried on extensively. There are mineral springs in the town and neighborhood, and the city is a popular summer resort. Kingston was founded in 1783, on the ground formerly occupied by Fort Frontenac. Population in 1909, 20,000.

Kingston, a city and the capital of Jamaica, situated on the southeast coast. The harbor is 6 miles long by 2 miles wide and forms an excellent anchorage for vessels. On Jan. 14, 1907, the city was visited by an earthquake, which, with the fire that followed, caused a loss of 2000 lives and a property loss of many million dollars. Population, 46,542.

Kingston, N. Y., the county-seat of Ulster co., 55 mi. s. of Albany, on the Hudson River and on the New York, Ontario & Western, the Walkill Valley and other railroads. The city is the center of a large trade in coal, stone, brick, lime, lumber and cement, the last of which is especially famous. Kingston and Ulster academies are located here, and the city has several libraries, Kingston Point Park and a railroad bridge 150 feet above tidewater. The Senate House is historically interesting as the early seat of the state legislature, when the city was for a time the capital of the state. The first settlement was made in 1652 by the Dutch and was called Esopus, from the neighboring indians. It was a dependency of Fort Orange until organized as Wiltwyck in 1661. Three years later the English took control and changed the name to Kingston. The adjoining villages of Rondout and Wilbur were added in 1872, and the place was incorporated as a city. Population in 1905, 25,556.

Kingston-upon-Hull. See HULL.

King William's War. See FRENCH AND INDIAN WARS.

King'wood, a beautiful, dark-colored wood, sometimes variegated with violet streaks, which closely resembles West Indian rosewood. It is used for small cabinet work.

Kinkajou, *kin'ka joo*, a carnivorous mammal of northern South America, related to the raccoon. In habits it is nocturnal, and it is docile when captured. In shape it resembles the lemur, the legs being short, fur close and woolly and tail long and prehensile. Kinkajous feed chiefly on small animals, insects, birds and honey.

Kio'to, **Kyoto** or **Saikio**, a large city of Japan, on the island of Hondo, in an extensive plain, 230 mi. s. w. of Tokyo, with which it is connected by railway. It was formerly the special residence of the mikado and the seat of his court, and the chief buildings are the old imperial palace and the residence of the shogun. It is the center of religion, of learning and of artistic manufactures, such as carved ivory ornaments, lacquered ware, bronze ornaments, brocaded and embroidered silks, porcelain and cloisonné ware. Kioto has many good schools and an imperial university. Population in 1904, 380,568.

Kiowa, *ke'o wah*, a powerful and peculiar tribe of indians that seem distinct from any of the other families. They were hostile to the whites and, with the Comanches and Chinooks, were for many years among the most troublesome of the western indians. The remaining

Kiowas are now living outwardly like the whites.

Kip'ling, (JOSEPH) RUDYARD (1865-), an English poet and writer of fiction. He was born at Bombay, India, but was sent to England to be educated and in 1878 entered the United Service College at Westward Ho. Many of the incidents of his life here were afterwards described in *Stalky & Co.* On his return to India he became sub-editor on the *Civil and Military Gazette* at Lahore, which position he



RUDYARD KIPLING

held until 1889. During this time there appeared in the *Gazette* many of his short stories and poems, which were afterwards collected and published in book form. In 1892 he went to the United States, and while there he married Miss Caroline Starr Balestier. In 1899 he traveled in South Africa, and on his return he settled in England. Kipling may be reckoned as one of the most forceful of modern fiction writers, on account of his vivid descriptions of life in India, his keen insight into nature and character and his well-nigh unerring ability to grasp the telling points in whatever he seeks to describe. Of his long list of books, the following may be mentioned: *Departmental Ditties*, *Plain Tales from the Hills*, *Soldiers Three*, *The Phantom Rickshaw*, *Wee Willie Winkie and Other Stories*, *The Light that Failed*, the two *Jungle Books*, *The Day's Work*, *Captains Courageous*, *Kim*,

generally considered his greatest work, the *Just-So Stories, The Five Nations and Traffic and Discoveries*. His versatility may be best seen by a comparison of the almost brutal realism of *Soldiers Three* and the stories in the collection known as *Many Inventions*, with the super-sensual, mystic atmosphere of *The Brushwood Boy*, or *They*.

Kirghiz, *kir gecz'*, a wandering Mongol-Tartar race, numbering in its various branches about 3,000,000 and inhabiting the steppes that extend from the lower Volga and the Caspian Sea in the west to the Altai and Thian-Shan Mountains in the east, and from the Sea of Aral and the Syr Daria in the south to the Tobol and Irtysh on the north.

Kirkville, *kurks'vil*, Mo., the county-seat of Adair co., 204 mi. n. w. of Saint Louis, on the Wabash and the Quincy, Omaha & Kansas City railroads. The city has a considerable trade with the surrounding agricultural region and contains iron works and other factories. A state normal school and the American School of Osteopathy are located here. It was settled in 1840. Population in 1900, 5966.

Kirkwood, *kurk'wood*, SAMUEL JORDAN (1813-1894), an American politician and administrator, born in Hartford co., Md., educated at Washington, D. C. He went to Ohio in 1835, studied law, and was admitted to the bar in 1843. Twelve years later he removed to Iowa, where he engaged in manufacturing. He became conspicuous as a member of the new Republican party and in 1859 was elected governor of Iowa. He became known as one of the most faithful and efficient of the famous "war governors." At the close of the war he was elected to the United States Senate. In 1875 for the third time he was elected governor of the state and at the close of his term again entered the United States Senate. In 1881 he was made secretary of the interior by President Garfield, but resigned in the following year and retired from public life.

Kishinev, *ke'she nyef*, a town of Russia, capital of the Government of Bessarabia, on the Byk, a tributary of the Dniester. In 1812 only a small town, it is now the seat of the civil and ecclesiastical authority, has many churches, schools, theaters and large markets for cattle and corn. Population, 125,787.

Kiss, AUGUST (1802-1865), a German sculptor whose first important work was the *Mounted Amazon Attacked by a Tiger*. This is acknowledged to be his masterpiece, but among his other important works are a statue of *Frederick the*

Great, a statue of *Saint George Slaying the Dragon* and a marble group of *Faith, Hope and Charity*.

Kitchen Cabinet, a name applied to a group of men who, during Andrew Jackson's administrations as president, exercised a great influence upon the policy of the government, though they held no important offices. The chief members of this circle were Major William B. Lewis, Isaac Hill, Amos Kendall, Duff Green and Francis P. Blair, Sr.

Kitch'ener, HORATIO HERBERT, First Viscount Kitchener of Khartum, of the Vaal and of Aspell (1850-), a British general, born at Gunsborough Villa, in County Kerry, Ireland. He was educated at the Royal Military Academy in Woolwich and entered the army in 1871 as a lieutenant of engineers. Later he was engaged in surveys in Egypt and vicinity and was rapidly promoted to commands with the British force in Egypt, being conspicuous in the expedition which vainly tried to keep open communication with General Gordon at Khartum. In various minor campaigns in Africa he attained distinction and won promotion, being given high offices. In 1896 he began an active campaign for the recovery of the lost provinces of Upper Egypt, and the capture of Khartum in September, 1898, marked the successful close of a brilliant series of engagements. During the Boer War he was chief of staff to Lord Roberts and rendered valuable service to the British force. When Roberts returned to England Kitchener became commander in chief.

Kitchen Middens, the name given to certain mounds, from 3 to 10 feet in height and from 100 to 1000 feet in length, found in Denmark, the north of Scotland and other localities, consisting chiefly of the shells of oysters, cockles and other edible shellfish. They are the refuse heaps of a prehistoric people unacquainted with the use of metals, all the implements found in them being of stone, bone, horn or wood. Fragments of rude pottery occur. The bones are all those of wild animals, with the exception of those of the dog. Similar shell deposits occur on the eastern shores of the United States and probably were formed by early Indians.

Kite, a bird of prey belonging to the family of falcons, but differing from the true falcons in having a somewhat long, forked tail, long wings, short legs and weak bill and talons. This peculiarity renders it the least formidable of the birds of prey. The American swallowtail

kite is a beautiful bird with glossy black back, wings and tail, and white under parts.

Kites have been known since earliest times and in certain countries are still the chief amusement of the people. In Japan kites strong enough to lift a man were made six hundred years ago, in order to spy out the force of an enemy in times of war. Not only the youths of Japan but the adults, also, enter into kite-flying with great zest, and some of the kites themselves are beautiful and elaborate productions, decorated with the highest art. In China the kite-flyer often has a number of kites in the air at once, all attached to a common string, and the greatest skill and patience are nec-



KITE

essary to keep them separate or disentangle them when they have been blown together by a strong wind. Fish, butterflies, dragons and birds are imitated in kites by the skilful Chinese, and many of these peculiar forms have found their way into stores of the United States. In the United States, kite-flying is in some localities a favorite pastime of children, and since the invention of the box kite, it has become possible to fly them very successfully in restricted space. Even here, kite-flying is not altogether a pastime, for besides the scientific use of kites in meteorological observations, use is made of them in carrying messages, in photographing landscapes and, to a considerable extent, in advertising. It has become no uncommon thing to see over a large out-door assembly a number of kites bearing advertising banners on their strings.

Kit'tiwake, a species of gull, found in great abundance in all the northern parts of the world, wherever the coast is high and rocky.

It is a small, snow-white bird, with pearly blue upper parts. It takes its name from its peculiar cry.

Kit'tredge, ALFRED B. (1861-), an American politician, born in Cheshire County, New Hampshire. He was educated at Yale University, graduated from the Yale Law School and was admitted to the bar in 1885. In the same year he removed to Sioux Falls, S. D., where he obtained a large law practice. He was elected to the state legislature in 1889, serving four years, and in 1901 was appointed United States senator. He was elected for a full term in 1903.

Kiushiu, *kyoo'shoo'*. See JAPAN.

Klamath, *klah'mat*, a fairly civilized indian tribe, who now live on their reservation, but who were once important in southern Oregon, where they held as slaves the captives they made in their warfare. See MODOC.

Klausenburg, *klow'zen boorK*, (Hungarian, *Kolozsvár*), an Hungarian town, the former capital of Transylvania and the present capital of the County of Klausenburg. It carries on an active trade and has manufactures of cigars, beet sugar, cloth and paper. It is the seat of a Reformed and a Unitarian superintendent and has several educational institutions of importance. The greater part of the inhabitants are Magyars. Population in 1900, 49,295.

Klondike, the region surrounding the Klondike Creek and its tributaries, in the Canadian Territory of Yukon. The Klondike placer mines are located in the beds and along the banks of the Bonanza, the El Dorado and other tributary streams and creeks of the Klondike. This district is just east of the Alaskan border line, 2200 miles from the mouth of the Yukon River. Gold was discovered here by G. W. Cormack, a native of Illinois, in August, 1896. The gold lies all the way through a frozen bed of muck, fine and coarse gravel, and is free in large grains and nuggets. The world at large learned of the rich Klondike mines in July, 1897, and before the middle of August, 6000 men were on their way to the Klondike district. Dawson City, which sprang up after the advent of the crowds of miners, is the chief trading post of the district (See DAWSON). It is estimated that over \$2,000,000 in gold was taken from the Klondike placer mines in 1897. Mining operations are seriously embarrassed by the short summer period, as the limit of outdoor work is about three months. Miners excavate pay dirt during the winter months and wash

the dirt during summer. In 1902 a diminution in the supply of gold was noticeable. Several of the richest claims had been exhausted, and no compensating new fields were discovered.

Kneipp, knipe, SEBASTIAN (1821-1897), a German priest who is best known for the water-cure treatment which he advocated. One of his principles is that patients should walk barefooted in the snow in winter and on the wet grass in summer. Sunshine and settled routine of exercise in the open air are important factors in his system. Establishments of the Kneipp treatment are to be found in many cities of the world, including the principal ones in the United States.

Knife, nife, a tool used for cutting. A knife has a blade and a handle. These are usually made of two parts and joined. There are nearly as many kinds of knives as there are uses for them. Savages made knives of stone by hewing the edge very thin and giving the blade a rough point. Bone, ivory and horn are used for paper knives, but table knives are made of steel or of bronze and plated with silver. Steel is used for the blades of knives that require a sharp edge. The pocket knife is a Yankee invention and was first made in Connecticut. A pen knife is a small pocket knife with a thin, narrow blade; it was so named because knives of this style were in general use for making quill pens before steel pens became common (See PEN). In sharpening a knife, both sides of the blade should be ground alike, and in using it, generally the edge should be turned so as to whittle from the holder. The best results are obtained by drawing the blade slowly toward the point as it is pushed forward through the wood.

Knight, nite. See CHIVALRY.

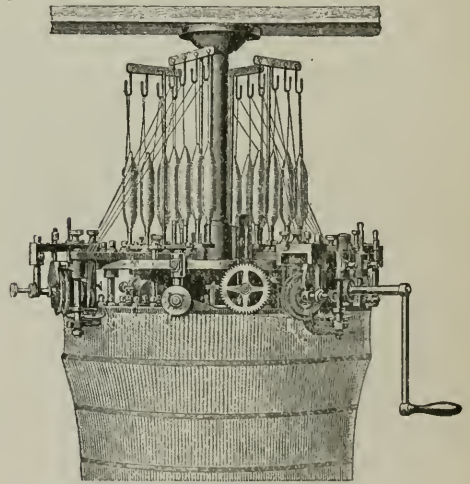
Knight'hood, ORDERS OF, the name given to organized and duly constituted bodies of knights. The orders of knighthood are of two classes—associations or fraternities possessing property and rights of their own as independent bodies; and merely honorary associations, established by sovereigns within their respective dominions. To the former class belonged the three celebrated religious orders founded during the Crusades—Templars, Hospitalers and Teutonic Knights. (For the costume of a medieval knight, see DRESS, *color plate I*, Fig. 9.) The other class embraces most of the existing European orders, such as the Order of the Golden Fleece, the Order of the Holy Ghost, the Order of Saint Michael. The chief British orders are the orders of the Garter, the Thistle, Saint

Patrick, the Bath, Saint Michael and Saint George, the Star of India and of the Indian Empire. The various orders have each their appropriate insignia, which generally include a badge or jewel, a collar, a ribbon of a certain color and a star.

Knights Hos'pitalers of Saint John. See JOHN, KNIGHTS OF SAINT.

Knights of Labor, a labor organization founded at Philadelphia in 1869. Its operations were secret, but its professed object was the amelioration and protection of the laboring classes. Of late years the membership has largely decreased through internal dissensions and ill-advised strikes, and it has been largely superseded by the American Federation of Labor.

Knitting Machine. The first knitting machine was the stocking frame, invented by William Lee of England, in 1589. An improved form of this machine was introduced into the



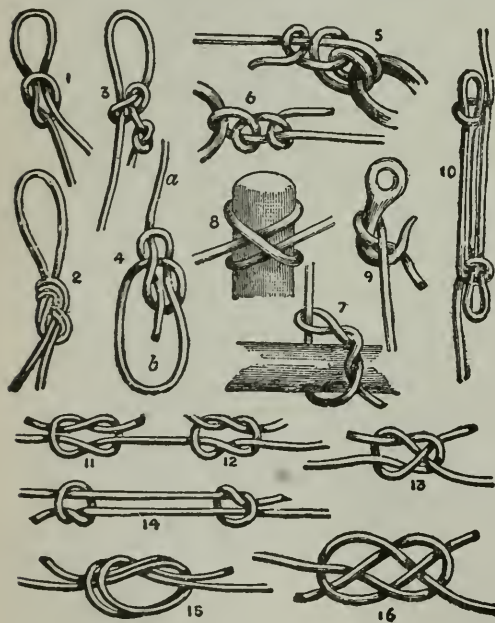
KNITTING MACHINE

United States early in the eighteenth century, and power was first applied to the knitting machine at Albany, N. Y., in 1831. The most common form of knitting machine now in use is the circular, or rotary, machine, which knits a circular web. The needles are arranged in rows around a horizontal circular frame. Each needle has a hook at the end, by means of which it draws down the thread and makes a loop as it is depressed. When the needles are again elevated the loop is slipped off over this hook and forms a part of the web as the next hook is joined to it. The needles are upright and have an upward and downward motion, produced

by means of cams on the side. The web extends downward within the circle and has a weight attached to its lower end to hold it in position. The machines are automatic and so perfectly adjusted that a boy can tend four of them. They are used extensively in the manufacture of hosiery and underwear.

Knotgrass or **Knotweed** or **Door-mat**, a very common plant of the buckwheat family, remarkable for its wide distribution. It is a much-branched herb, with trailing stems and knotted joints, that grows in a mat, pressed flat to the ground. The flowers are not easily seen, but are small and greenish and pink in color. Knotgrass is remarkable for its varied forms and for the persistence with which it grows in hard or trampled ground.

Knots include the various methods of tying, fastening and joining ropes or cords. From



one hundred fifty to two hundred different kinds of knots may be enumerated, mostly used on shipboard, though almost all occupations using ropes or cordage have special kinds of knots adapted to their different requirements. While the great majority of these are purely technical, there are a few so generally useful in the everyday occurrences of life that they may be briefly described. The figures represent the various knots before they are drawn taut, the better to show the method of tying. Generally, the requirements of a useful knot may be stated

to be that it should neither slip nor jam; that is, that while it holds without danger of slipping while the strain is on it, when slackened it should be easily untied again. The simplest knot is the common one tied on the end of a thread or cord to prevent its slipping. By passing a loop, instead of the end of the cord, the common slip knot (1) is formed; and a useful fixed loop is obtained by tying a simple knot, or the figure 8 knot (2), on the loop of a cord. One of the simplest and most useful running knots for a small cord is made by means of two simple knots (3). The most secure method of fastening a line to a bucket is the standing bowline (4); and a running bowline is formed by passing the end *a* through the loop *b*, thus making a running loop. Another good knot to make fast a bucket is the anchor bend (5). Out of the score or so of methods of fastening a boat's painter the one which will be found most useful is the well-known two half-hitches (6). The timber hitch (7) is useful for attaching a line to a spar or a stone, and the clove hitch (8) is invaluable for many purposes. It is very simple and cannot slip. A simple method of fastening a rope to a hook is the blackwall hitch (9), where the strain on the main rope jams the end so tightly against the hook that it cannot slip. There are many methods for shortening a rope temporarily, one of them being the sheep shank, the simplest form of which is shown in 10.

Of the methods for uniting the ends of two cords, the simplest and one of the most secure is the common reef knot (11), which must be carefully distinguished from the "granny" (12), which will jam if it does not slip; the reef knot will do neither. For very small cords or thread the best knot is the weavers' (13). The fisherman's knot is a very useful one for anglers and is formed by a simple knot in each cord being slipped over the other (14); when drawn taut it is very secure, and it is easily separated by pulling the short ends. A useful method of uniting large ropes is shown in 15; tie a simple knot on the end of one rope, and interlace the end of the other and draw taut. This tie may also be made with the figure 8 knot. For very large ropes the carrick bend (16) is the simplest and most secure. The bowline bend is formed by looping two bowline knots into each other. See **SPLICING**.

Knowles, nohlz, JAMES SHERIDAN (1784-1862), a British dramatist. He tried acting for a time, but meeting with indifferent success, he devoted himself to teaching, first in Belfast

and afterward in Glasgow. His tragedy of *Caius Gracchus* was performed in 1815 with success, and from this time he had a prosperous career as author, actor and lecturer. Among his best plays are *Virginus*, *The Wife*, *The Hunchback* and *The Love Chase*. About 1845 he retired from the stage. He afterward became a Baptist preacher and published several theological works.

Know'-Nothings, the popular name for the American party, which was formed in the United States shortly before 1855. The party gained considerable success in that year, lost its ground hopelessly in 1856 and soon after disappeared from American politics. Its distinctive principle was that the government of America must be in the hands of Americans; naturalization was to follow only after twenty-one years' probation, and allegiance to any foreign potentate or power was to be a bar to selection for political office. The term *Know-Nothings* was applied to them because they refused to tell anything that transpired at their meetings.

Knox, *noks*, HENRY (1750-1806), an American revolutionary soldier, born in Boston. At an early age he entered on a military career, and he took an active part in the contests immediately preceding the revolution. He took part in the battles of Bunker Hill, Brandywine, Germantown, Monmouth, Trenton and Yorktown; was for a time a member of Washington's staff, and was appointed by Washington to receive the surrender of the British forces in New York State. In 1785 he was appointed secretary of war, and he held the office for ten years. His bravery, skill and constant loyalty to Washington made him one of the commander in chief's most trusted friends.

Knox, JOHN (1505-1572), the chief promoter of the Reformation in Scotland, was born in Gifford, in East Lothian. He was educated in Glasgow and at Saint Andrews, became an ardent advocate of the reform faith in about 1542 and four or five years later preached to the beleaguered Protestants in the castle of Saint Andrews. When this castle was taken by the French, Knox was sent to France with the other prisoners and put to the galleys, from which he was released in 1549. Two years later he was appointed chaplain to Edward VI and preached before him at Westminster. On the accession of Mary in 1554, Knox left England and sought refuge at Geneva. Here he was soon involved in a controversy and, after a few months, re-

turned to England, but again went back to Geneva the following year at the request of the congregation which he had left there. In May, 1559, Knox returned to Scotland and joined the lords of the congregation. He preached at Perth with such fire and effect that his hearers made a general attack upon the churches of the city, overturned the altars, destroyed the pictures, broke the images and almost leveled the monasteries to the ground. He was appointed minister of Edinburgh, and from that time until his death he took a leading part in the proceedings of the Protestants and had the principal share of the work in drawing up the confession of faith which was accepted in 1560 by Parliament. The next year he was involved in a sharp controversy with Mary Stuart, because of her attempt to reestablish the Catholic form of worship in Scotland. In 1569 he retired for a time to Saint Andrews, and three years later his health gave way. He married Margery Bowes in 1555. Besides preaching, Knox wrote extensively. Among his works are the *First Blast of the Trumpet against the Monstrous Regiment of Women* and the *History of the Reformation of Religion within the Realm of Scotland*. The best edition of his works is that edited by David Laing. Consult M'Crie's *Life of Knox*.

Knox, PHILANDER CHASE (1853-), an American lawyer and statesman, born in Brownsville, Pa. He graduated from Mount Union College, Alliance, Ohio, in 1872, was admitted to the bar three years later and with the exception of one year, in which he was assistant United States district attorney, was engaged in active practice in his native city until 1901, when he was appointed attorney-general by President McKinley. This position he retained until June, 1904, when he resigned to accept an appointment to the United States Senate, as successor of M. S. Quay. He was elected for a full term in 1905.

Knoxville, TENN., the county-seat of Knox co., 110 mi. n. e. of Chattanooga, on the Holston River and on the Atlanta, Knoxville & Northern, the Southern and other railroads. The city is beautifully situated at the foothills of Clinch Mountains and is the seat of the University of Tennessee, an agricultural college, the Nashville College for Colored Students and the state institutions for the insane and the deaf and dumb. Knoxville is one of the leading inland cities of the South. It has a large trade in marble, exports considerable agricultural produce and contains manufactories of cotton and

Koala

woolen goods, flour, lumber, wagons and other articles. The place was settled in 1787. It was the capital of the "Territory South of Ohio" from 1792 to 1796 and of the state from 1796 to 1811. During the Civil War it was captured by General Burnside, in August, 1863, and was thereafter held by the Union forces. Population in 1902, 32,637.

Koala, *ko ah'lah*, an Australian animal, somewhat resembling a small bear, hence, sometimes called the *native bear*. Its toes are divided into groups of two and three, in which it differs from all other quadrupeds. This arrangement adapts the koala to grasping and hanging from branches of trees. The koala is about two feet long and is covered with a woolly fur, which is short and gray. It is nocturnal in its habits and feeds on leaves, chiefly of the eucalyptus. Like the kangaroo, the female has a pouch on its abdomen, in which the young are carried.

Kobe, *ko'bay*, a seaport of Japan, adjoining Hiogo so closely as to form one town with it. It lies on the western shore of the bay of Osaka and is 22 miles from the city of Osaka. It has docks, railway shops and a shipyard. Its harbor is safe and deep, and it has direct steamship communication with China, Australia and various European and American ports. Among its manufactures, the chief is paper. Kobe is one of the ports opened by treaty to foreign commerce, and it is considered the most attractive of them. Its trade is more extensive than that of any of the other treaty ports. Population in 1904, 285,002.

Koblentz or **Koblenz**, *ko'blents*. See COBLENZ.

Koch, *koK*, ROBERT (1843-), a noted German physician and bacteriologist, born at Clausthal, Hanover. He was educated at Göttingen, and he practiced for a number of years with great success. Doctor Koch became noted for his investigation of bacteria as a source of disease, and he was able to place bacteriology on a firm foundation as a science. In 1882 he discovered the germ which produces consumption, and the next year he was sent by his government to Egypt to investigate the cholera; there he discovered the bacillus which causes this disease. In 1890 he proposed the lymph treatment for consumption; but the treatment has not been entirely successful. Doctor Koch is a member of the medical faculty of the University of Berlin. See GERM THEORY OF DISEASE; CHOLERA; TUBERCULOSIS.

Kola

Koh-i-noor, *ko e noor'*, or **Mountain of Light**, the name of the most celebrated diamond. According to legend, it was in possession of a ruler in India more than five thousand years ago. It first came into history in the fourteenth century, when it was brought to Delhi. At the sacking of this city in 1739 it was carried to Afghanistan, but was returned to India later,



ROBERT KOCH

and at the conquest of Punjab it came into possession of the British East India Company, by whom it was presented to the royal family of Great Britain, in whose possession it still remains. It has been reduced, by successive cuttings, from 793 to 106 carats, and it is now valued at \$600,000. See DIAMOND.

Ko'komo, IND., the county-seat of Howard co., on the Wildcat River and on the Lake Erie & Western, the Pittsburg, Cincinnati, Chicago & Saint Louis and other railroads. The city is in an agricultural region, but is principally engaged in manufacturing. Glass, pottery, paper, rubber goods and automobiles are the principal products. It has a number of churches, a beautiful park, a public library and a high school. Kokomo was settled in 1844 and was chartered as a city in 1855. Population in 1900, 10,609.

Ko'la or **Co'la**, a genus of plants native of western Africa. The fruit consists of two, sometimes more, separate pods, containing

several seeds about the size of horse-chestnuts, which have been found to contain caffeine, the active principle of coffee and also the same active principle as cocoa, with less fatty matter.



KOLA

A drink prepared from them is largely used in tropical Africa and is said to have digestive, refreshing and invigorating properties. It has been introduced into this country.

Kolmar, *kole'mahr*. See COLMAR.

Kongfutse, *kong fute'see*. See CONFUCIUS.

Kongo or **Congo**, the largest, and, excepting the Nile, the longest, river in Africa, and one of the largest rivers of the world. It has various names along its course. It rises in the mountainous region between Tanganyika and Nyassa and flows southwest under the name of the Zambesi River, entering Lake Bangweolo, or Bemba. From here it is continued as the Luapula northward into Lake Moero. The outlet of this lake flowing north receives in its course the great Lualaba. The river has many tributaries, among which are the Aruwimi, the Ubanghi, the Sanga and the Kassai. About eighty miles below Stanley Falls it is joined by the Lomani, and a little east of this point it begins its great bend to the west. About three hundred miles from the mouth of the Kongo is Stanley Pool, an enlargement of the river. The total length is perhaps 3000 miles, of which about one-half is navigable. Navigation is free from the mouth for about ninety miles, where it is interrupted by cataracts and falls, and is free again between Stanley Pool and Stanley Falls. The chief towns on the river are Matadi, Boma and Banana.

Kongo Free State or **Congo Free State**, an independent state in central Africa. It reaches the Atlantic at the mouth of the Kongo River by a narrow neck of land and extends inland so as to cover an immense area lying mainly south of the river. In 1876, under the organization of King Leopold II of Belgium, the International African Association was founded for the purpose of promoting the colonization and civilization of Africa. At the expense of Leopold, Henry M. Stanley was sent to prepare for the development of the resources of the Kongo region (See STANLEY, HENRY MORTON, Sir). The Kongo Free State was founded in 1884 under the auspices of the Kongo International Association, and recognition for this territory as an independent sovereignty was obtained from the European governments and the United States in 1885, by the act of the Congress of Berlin, which declared that the state was free and neutral, that the trade was open to all nations and that the slave trade was to be suppressed. Leopold was made the sovereign of the state. The central government is located at Brussels and comprises the king of Belgium and a secretary of state. The direct administration of the government is carried on at Boma by a governor-general. In 1890 the right was reserved to Belgium of annexing the Kongo Free State after ten years. In 1901 no change was made in the existing form of government, but in 1908, by virtue of authority vested in the King, the State was annexed to Belgium.

The Kongo is the chief river, and with its tributaries it drains a great part of the land. The climate is tropical, and the lowlands along the coast are unhealthy, but in the interior Europeans can live nearly as safely as in their home countries. Among the products grown are hemp, bananas, sugar cane, rubber trees, coffee, tobacco, corn and rice. The trade in rubber and ivory is very valuable. The commerce has been increasing rapidly; the trade is carried on chiefly with Belgium, Great Britain, Germany and Holland. The principal stations are Boma, the capital; Banana; Ndolo; Leopoldville, the probable future capital; Stanley Pool, Stanley Falls, and Matadi, the railway city. The communication between the interior and the Atlantic has been greatly facilitated by the construction of a railroad line between those places on the Kongo where navigation is impossible on account of the numerous rapids and falls in the river. The inhabitants are mostly of the Bantu race. The population has been estimated

at from 14,000,000 to 30,000,000; the number of Europeans, most of whom are Belgians, is about 2300. Consult Stanley's *The Congo and the Founding of Its Free State*.

Königrätz, *kō'nig grayts*. See SADOWA, BATTLE OF.

Königsberg, *kō'nigs berK*, a fortified town of Prussia, capital of the Province of East Prussia, situated about 5 mi. from the mouth of the Pregel. There are a number of buildings of historical interest, among them the Schlosskirche, in which Frederick I and William I were crowned. The university, founded in 1544, is attended by 800 or 900 students and has a library of 225,000 volumes, a zoölogical museum and other valuable collections. The manufactures of Königsberg are various, including machinery, pianos, tobacco and cigars. The chief trade is in grain, flax and hemp, timber, tea, petroleum and leather products. Population in 1900, 189,483.

Koo'doo or **Kudu**, the native name of a striped antelope of South Africa. The male is distinguished by its fine horns, nearly four feet long and beautifully twisted in a wide spiral. The koodoo is of a grayish-brown color, with a narrow white stripe along the back and eight or ten similar stripes down either side.



KODOO

It is about four feet in height and fully eight in length.

Kootenay, **Kootenai** or **Kutenai**, a small family of indian tribes who lived on the borderland between Montana and British Columbia and are now zealous Catholics, quite well civilized and living comfortably on their reservations. They have always been honest and good friends of the whites.

Kootenay River, a river of British Columbia, which rises in the Rocky Mountains and flows southward into the United States, passing through Montana and Idaho, and then reënters British Columbia, where it flows through Kootenay Lake and thence into the Columbia River. It is about 400 miles long, but only a small part of it is navigable, because of rapids.

Koran, *ko'ran* or *ko rah'n'*, or **Alcoran** (the reading, or that which is to be read), the book containing the religious and moral code of the Mohammedans, by which, indeed, all their

transactions, civil, legal and military, are regulated. According to the Mohammedan belief, the Koran was written from the beginning in golden rays on a gigantic tablet in the highest heavens, and portions were communicated by the angel Gabriel to Mohammed at intervals during twenty-three years. These portions were dictated by Mohammed to a scribe and kept for the use of his followers. After Mohammed's death, they were collected into a volume at the command of Mohammed's father-in-law and successor, Abu Bekr. This form of the Koran, however, was considered to contain erroneous readings, and in order to remove these Caliph Othman, in the thirtieth year of the Hejira (652 A. D.), caused a new copy to be made from the original fragments and then ordered all the old copies to be destroyed. The leading doctrine of the Koran is the Oneness of God, clearly laid down in the symbol of the Moslem, "God is God, and Mohammed is his prophet." To Christ—who is simply regarded as one of the prophets—Adam, Noah, Abraham, Moses and Mohammed, it assigns a place in the seventh or highest heaven, in the immediate presence of God. The doctrines of good and bad angels and of the resurrection and final judgment are fully set forth, and also God's mercy, which, instead of the merits or good works of a man, secures entrance into heaven. Idolatry and the deification of created beings are severely condemned. The Koran prescribes prayer five times a day with the face turned toward Mecca; fasting; alms, and the pilgrimage to Mecca and Mount Ararat, something similar to which had existed with most sects before Mohammed. Purification must precede prayer, and where water is not obtainable, dry dust or sand may be used. To give alms was always a particular trait of the Arabians, but Mohammed made it obligatory. The language is considered the purest Arabic. See MOHAMMEDANISM.

Kordofan, *kor do fahn'*, a country of Africa, in the Eastern Sudan, between Darfur and the White Nile. From 1821 to 1883 it formed one of the Sudanese provinces of Egypt, but at the latter date it was freed from Egyptian rule through the Mahdi's insurrection and has since been virtually independent. The surface is generally flat, and the soil, barren during the dry season, is covered with vegetation during the rainy season. The climate in the wet season, lasting from June to October, is extremely unhealthful; in the dry season, though healthful, it is intolerably hot. The principal articles

Korea

of trade are mucilage and ostrich feathers. Cultivation is almost wholly confined to a species of millet. The inhabitants consist largely of negroes and Arabs. The chief town is El Obeid. Population, about 300,000.

Kore'a or **Corea**, a kingdom of Asia, lying between 125° and 129° 36' east longitude and 34° 40' and 43° north latitude. It is bounded on the n. by Manchuria, from which it is separated in part by the Yalu River, and it projects to the s. e. between the Japan Sea and the Yellow Sea and is separated from Japan by Korea Strait. Its length is 560 miles and its area is 82,000 square miles, or a little less than that of Minnesota. The population is variously estimated at from 8,000,000 to 15,000,000

A mountain range extends the entire length of the kingdom along or near the northwest and the eastern shore, and this contains peaks varying in height from 4000 to 8000 feet. To the south and west the land slopes gently to the coast. The mountains are well wooded, as is most of the northern part of the country. The southern and western sections are covered with a fertile soil, contain numerous streams and are in other ways well suited to agriculture. The climate in the north resembles that of China in the same latitude. The winters are somewhat severe and the summers warm. The climate of the southern part of the kingdom resembles that of Japan, being mild and equable. Everywhere there is sufficient rainfall for agricultural purposes.

The mineral resources include coal, found in the west central part; gold, which is obtained along the rivers in the north; copper, lead ore, and granite, limestone and other building stones. Mining has not been extensively developed, but parties from the United States, Germany and Great Britain have obtained concessions for gold mining, and the output is now about \$2,240,000 a year. Considerable copper is also exported, and coal is mined for local use. With the exception of the northern region, the entire kingdom is well suited to agricultural purposes, and agriculture forms the occupation of nearly all the inhabitants. In the north, crops are confined to barley, oats and millet, but in the central and southern regions rice, corn, wheat, cotton, tobacco, potatoes and vegetables are raised in large quantities. Rice is the most important food plant. Fruits thrive, but owing to the frequent rains they have little or no flavor. Cattle, hogs and goats are raised, and oxen are generally used for work animals, the horse being reserved for riding. The raising of sheep is

Korea

forbidden by law. Until recently the inhabitants knew nothing of butter, cheese and milk, but since the introduction of cattle these are gradually coming into use. The manufactures are limited and are at present confined to the weaving of fabrics from hemp and grass, the manufacture of coarse cotton and silk cloth, mats, bamboo screens and inlaid ware, also the manufacture of paper of a peculiar quality, used by the natives in making hats, other articles of clothing and umbrellas. Formerly the Koreans were noted for their skill in those arts which now specially characterize the manufactures of the Chinese and Japanese, and it is supposed that these arts were introduced into Japan through Korea.

There are practically no good roads, and outside the seaports wheeled vehicles are unknown. Travel and transportation of commodities are by pack animals. The nobility travel by sedan chairs. A railway connecting Chemulpo with Seoul is in operation, and another from Seoul to Fusan, the southern seaport, is in the process of construction. The kingdom contains over 2000 miles of telegraph lines, and a postal system conforming to the regulations of the Postal Union is in operation. The commerce of the country is limited and is carried on chiefly with China and Japan, though the United States, Great Britain, Germany and France have commercial treaties with Korea and carry on a limited trade.

The government is an absolute monarchy. The king is assisted by a ministry of ten members, to whom are added five councilors, the whole making a supreme council. The council passes upon acts before they are signed by the king. For local administration the country is divided into provinces. Education is general and theoretically reaches from the common schools to the university. However, the state university has not yet been established. There are numerous schools, in which Japanese and other foreign languages are taught, and several mission schools are maintained by various denominations.

The inhabitants are supposed to have sprung from the intermarriage of Chinese, Ainos and other races and are of Mongolian descent. They differ somewhat in size, appearance and habits from the Chinese on the one hand and the Japanese on the other. The women live in seclusion. Polygamy is not legally authorized, but it is practiced to a greater or less extent. In religion most of the people are

ancestor and spirit worshippers, and their worship includes very many curious superstitions.

HISTORY. Korea is supposed to have been founded about 1100 B. C., and about 100 B. C. it was annexed to the Chinese Empire and continued this relation for somewhat over a century, when the kingdom was divided into three principalities. This condition lasted for about 1000 years. In 960 A. D. one of these principalities gained its independence and absorbed the others, and for the next 300 years Korea existed as an independent kingdom. During this time the arts flourished, and Buddhism obtained a very strong hold upon the country. At about the beginning of the fifteenth century, however, there was a revolution. Buddhism was overthrown, and a new dynasty was established. In 1592 the country suffered an invasion from the Japanese, who overran the kingdom, but were finally driven out by the Chinese. This military assistance resulted in making Korea again tributary to China, under which condition it remained until 1894, when, at the close of the China-Japan War, it was again made independent, though subject to Japanese influence. In the war with Russia, Korea sustained such a relation to Japan as to make it practically tributary to that country when the war closed. Consult Bishop's *Korea and Her Neighbors*.

Körner, kör'nur, KARL THEODOR (1791-1813), a German poet. He wrote the tragedies of *Rosamunde* and *Zriny* and a large number of dramas for the Theater Royal at Vienna, but he owes his fame to his celebrated patriotic lyrics.

Kosciusko, kos e us'ko, MOUNT, one of the highest mountain peaks in Australia, in the Australian Alps, in New South Wales, near the frontier of Victoria. It is 7340 feet high.

Kosciusko (Polish pronunciation, *kos choosk'-ko*), THADDEUS (1746-1817), a Polish patriot, a man of noble family. He was educated in the military school at Warsaw and was afterward sent, at the expense of the state, to complete his studies in France. He went to America (1776), where he attracted the notice of Washington, was appointed by him engineer, with the rank of colonel, and afterward general of brigade. He did not return to Europe till three years after the conclusion of the Peace of 1783. For some years after his return he lived in retirement, but after serving in his own country under Poniatowski, he was appointed in 1794 generalissimo of the insurgent forces and defeated the

Russians at Raclawice, near Cracow. At the battle of Maciejowice, however, his army was defeated, and he himself was wounded and taken prisoner. He remained in captivity for two years, but was liberated on the accession of Paul I of Russia, in 1796. After visiting England and America, he spent the remainder of his life chiefly in France. In 1817 he issued a letter of emancipation to his serfs.

Kossuth, kosh'oot, LOUIS (1802-1894), an Hungarian patriot. He studied law, in 1832 entered the upper house of the Diet as substitute for an absent member and acquired immediate influence. In 1841 he became editor of the *Pesth Journal*, an exceedingly liberal paper. During the Hungarian war for liberty he was chosen governor or dictator, but the intervention of Russia on the side of Austria rendered all the efforts of the Hungarians unavailing. Kossuth resigned, was succeeded by Görgey, and was kept as prisoner in Turkey, whither he had fled. He was released through the intervention of Great Britain and the United States, and on his visits to those countries met with an enthusiastic reception. When the settlement was effected between Austria and Hungary in 1867, he might have returned to Hungary, but he remained an exile until his death, which took place in Turin.

Koto. See NIGERIA.

Koumis or **Kumiss, koo'mis,** a preparation of milk, whether cow's, mare's, ass's or goat's, which is said to possess wonderful nutritive and digestive properties. In the United States it is made from cow's milk. It consists essentially of milk in which alcoholic fermentation has been developed. On the Asiatic steppes, where it has been long used as a beverage, it is made of mare's milk; but koumis of mare's milk or goat's milk has a somewhat unpleasant smell. Koumis is recommended by physicians in cases where the stomach will not retain food.

Kov'no, a town in Russian Poland, in the government of the same name, of which it is the capital. It is 506 miles southwest of Saint Petersburg, on the left bank of the Niemen. The chief manufactures are nails and beer. The population, a great part of which consists of Jews, was, in 1903, 73,743.

Kra'cow. See CRACOW.

Kraft, ADAM (?1440-1507), the most noted sculptor of the Nuremberg School in Germany. His first work of importance was executed when he was fifty years old. This was *The Seven Stations*, now found in the German Museum. Kraft is especially known for his

famous monuments and tombs, which are executed in wonderful architectural and sculptural designs. His greatest work is without doubt the *Tabernacle*, in the Church of Saint Lawrence. It is a pyramid more than sixty feet high and is especially beautiful for its splendor of ornamentation. Other works are *Tomb of the Schreyer Family*, *Tomb of the Rebeck Family* and the *Landauer Tomb*.

Krakatoa, *krah'ka to'ah*, a small volcanic island, situated in the Sunda Strait, about equally distant from Java and Sumatra. There was no eruption of the volcano from 1680 to 1883, but in August of the latter year an eruption occurred which was one of the most violent in history. As the island is uninhabited, the eruption itself caused no deaths, but the gigantic sea waves which the disturbance generated caused great loss of life in the neighboring islands.

Krapot'kin, PETER ALENEYEVITCH, Prince. See KROPOTKIN, PETER ALENEYEVITCH, Prince.

Krefeld, *kra'felt*, or **Crefeld**, a town in Rhenish Prussia, in the Government of Düsseldorf, 34 mi. n. w. of Cologne. It is the principal locality in Prussia for the manufacture of silks, velvets and mixed silk goods. There are also manufactories of woolen, linen and cotton cloth, wax cloth, hosiery, soap, candles, paper, leather, chemical products and tobacco. Population in 1900, 106,928.

Krem'lin, the name used to denote the citadel of a Russian city. The most famous kremlin is that of Moscow, situated on the north bank of the river Moskva. It occupies a high triangular portion of land covering 100 acres and is surrounded by a wall one and a half miles long, with eighteen towers and five gates. Most of the buildings comprising the Kremlin were erected by Italian architects at the close of the fifteenth century, though the royal palace was built as late as 1831. Among the buildings are the cathedral, where every czar since Ivan IV has been crowned; the tower of Ivan the Great, with a gilt dome and thirty-four great bells; one of the largest arsenals in the world, museums, barracks and palaces. One of the remarkable curiosities of the Kremlin is the great czar bell, cast in 1733, measuring 60 feet in circumference and weighing almost 200 tons. See BELL.

Kriegsspiel, *kreeK'shpeel*. See WAR GAME.

Krish'na, in Hindu mythology, one of the manifestations of Vishnu and the most popular deity in the Hindu pantheon. See VISHNU.

Kris'tian'ia. See CHRISTIANIA.

Kronstadt or **Cronstadt**, the most important naval station of Russia, situated 20 mi. w. of Saint Petersburg, on the extremity of the Gulf of Finland. It has three harbors, which will accommodate a thousand vessels and which are closed by ice during five months of the year. Kronstadt was founded by Peter the Great in 1710. The city has a naval school, government navy yards and cannon foundry, building yards and sawmills. Population in 1897, 59,539.

Kropot'kin or **Krapotkin**, PETER ALENEYEVITCH, Prince (1842—), a Russian geographer and anarchist, born at Moscow. Though destined by his father to life at court, he entered the army as a member of a Cossack regiment in 1862 and, being stationed in Siberia, made numerous valuable explorations there. The policy of the Russian government toward the prisoners in Siberia embittered Kropotkin, and it was not long before he had openly espoused the anarchist cause. His convictions upon social and political matters were confirmed by a visit to Finland. Soon after, he devoted himself to spreading anarchist doctrines in Russia, was imprisoned, escaped to England and finally reached Switzerland, where he continued his propaganda. In 1879 he began the publication of *Le Revolte*, the official organ of the anarchists at Geneva. Expelled from Switzerland, he continued his work in France and England, where he afterward resided. In 1900 he visited the United States. Among his principal works are *The Memoirs of a Revolutionist*, *Law and Authority*, *In Russian and French Prisons*, *The Orthography of Asia*, *Modern Science and Anarchism*.

Kruger, *kroo'gur*, STEPHANUS JOHANNES PAULUS (1825-1904), a South African statesman, president of the South African Republic. In 1872 he became a member of the Executive Council of the African Republic, and when, five years later, the Transvaal was annexed to British territory, Kruger, as vice-president, strongly opposed the annexation. In 1883 he was elected president, and he was successively reelected in 1888, 1893 and 1898. President Kruger used all his powers and influence against British aggression, and in 1884 he succeeded in obtaining a considerable reduction in the suzerain powers claimed by Great Britain. He was also successful in defeating the Jameson raid in 1896. He believed that war with Great Britain was inevitable and had his country

equipped with arms and ammunition before the struggle began. When the British approached Pretoria in 1900, Kruger moved his capital eastward and in September crossed into the Portuguese possessions, whence he sailed for Europe in October. He made several attempts to secure the assistance of the European powers in putting an end to the war, but without avail, and he finally took up his residence at The Hague.

Krupp, FRIEDRICH ALFRED (1854-1902), known in Germany as the *Cannon King*. Upon the death of his father, he undertook the direction of the great Krupp works at Essen and vastly increased the capacity of the business. He invented a new bessemer steel, out of which he made rifles and cannons and a seamless tire for car wheels, and discovered a new method of hardening armor plate. At his death he was the richest man in the Empire. He was well known for his generous dealings with his employes, having built for them comfortable modern dwellings, each with its garden, and provided a pension fund of over \$4,000,000 for their benefit. The Krupp works cover over 150 acres. His daughter succeeded to his business.

Kry'olite. See CRYOLITE.

Kryp'ton, a gas resembling argon, existing in the atmosphere and obtained by distilling the heavier portion of liquid air. It is estimated that the atmosphere contains only one part in a million. Krypton boils at 151.7° below zero. When an electric spark is passed through it, it emits a yellowish-green light.

Kubelik, *koo'be lek*, JAN (1880-), a Bohemian violinist. He received his early education under his father and entered Prague Conservatory when twelve years old. In 1898 he made his first public appearance and two years later made his debut in Berlin and in London. Thereafter he made several tours of both Europe and America, where he created a furor by his remarkable technique, though his interpretative ability was not at first pronounced.

Kublai Khan, *koob'ly kahn'*, more properly, Khubilai Khan (1214-1294), a Mongol emperor who founded the twentieth Chinese dynasty, that of the Mongols of Yuen. In 1259 he succeeded his brother as grand khan of the Mongols, and in 1260 he conquered the whole of northern China, driving out the Tartar, or Kin, dynasty. Marco Polo, who lived at the court of this prince, describes the splendor of

his court and entertainments, his palaces and hunting expeditions, his revenues, his extraordinary paper currency and his elaborate system of posts. *Kublai Khan* is the title of a poetical fragment by Coleridge.

Kudu, *koo'doo*. See KOODOO.

Ku'fic. See CUFIC.

Ku-Klux' Klan, a secret society founded in the Southern states of the Union about 1866. Primarily, the object of the society was social improvement, but its political purpose was to intimidate negroes and those who were in favor of the government's reconstruction measures, and thus to prevent them from voting. It soon gained thousands of members, who operated under disguise and usually in the night. Many outrages and crimes were committed by them, and conflicts were frequent between the Ku-Klux Klan and the Loyal League, an organization of the same nature of opposite creed. In 1871 the government took active measures to break up the organization, and the Klan, having accomplished its purpose to a large extent, was soon disbanded. The organization never received the general support of the better element in the South.

Kulu'ri. See SALAMIS.

Kumassie, *koo mahs'ee*, or **Coomassie**, the capital of Ashanti, in western Africa, about 150 mi. n. of Sekondi, on the Gulf of Guinea. It is connected with Sekondi by the government railroad. Kumassie was taken by the British in 1874 and again in 1896. Population, estimated at 30,000.

Kumiss, *koo'mis*. See KOUMIS.

Kumquat, *kum'kwot*, a very small variety of orange tree, growing not above 6 feet high, whose fruit, of the size of a large gooseberry, is delicious and refreshing. It is a native of China and Japan, but has been introduced into Australia and the United States.

Kurdistan, *koor de stahn'*, an extensive territory of Western Asia, south of Armenia. It is a mountainous region, containing considerable forests of oak and other hard timber and also numerous pastures on which horned cattle, sheep and fine-haired goats are reared. There are in the valleys many fertile districts yielding rice, cotton, flax, fruits and gall nuts. The Kurds, to whom the territory owes its name, are not confined within its limits, but are found in considerable numbers eastward in Khorasan and over the hilly region of Mesopotamia, as far west as Aleppo and the Taurus. They are a stout, dark race, well formed, with dark hair,

Kuropatkin

small eyes, wide mouth and a fierce look. On their own mountains they live as shepherds, cultivators of the soil, and bandits. Their language is a dialect of Persian, now much mixed with Arabic and Syriac; their religion is Mohammedanism. The Kurds owe but slight allegiance to either Turkey or Persia, living in tribes under their own chiefs, who commonly exact duties on the merchandise which passes over their territory.

Kuropatkin, *koo ro pah't'kin*, ALEXEI NIKOLAYEVITCH (1848-), a Russian general. He won distinction in the Russo-Turkish wars, gaining promotion from lieutenant to colonel; became lieutenant general in 1890, and minister of war in 1898. In 1904 he resigned to assume command of the Russian troops in the Japanese war, but before the close of the war he resigned the chief command. See RUSSO-JAPANESE WAR.

Kyoto

Kuro Sivo, *koo'ro se'vo*, or **Japan' Cur'rent**, the name of a warm current in the North Pacific Ocean corresponding in position and direction to the Gulf Stream in the North Atlantic. It flows past Formosa, Japan, the Kuriles, the Aleutian Islands and thence bends southward to California. It is much inferior to the Gulf Stream in volume and is of a lower temperature. See CURRENTS, MARINE.

Kutenai, *koot'en i*. See KOOTENAY.

Ky'anite, a mineral of the garnet family, found both massive and in regular crystals. Its prevailing color is blue, but of varying shades. The best specimens take a high polish and are used for table tops, ink stands, paper weights and other ornaments. Kyanite is found in the United States in Massachusetts, Connecticut, Delaware and Virginia, and in Europe in Switzerland, Tyrol and Bohemia.

Kyo'to. See KIOTO.



L, the twelfth letter of the English alphabet, derived in form from the Phoenician, through the Greek and Latin. *L* has only one sound in English, but is silent in a few words, as *half, talk*. Its nearest allied letter is *r*, and there is no letter, accordingly, with which *l* is more frequently interchanged, instances of the change of *l* into *r* and of *r* into *l* being very common in various languages. In fact, in the history of the Indo-European alphabet, *l* is considered to be a later modification of *r*.

Labiatae, *la'be a'tee*, the botanical name of the mint family, a very important and extensive order of plants, so named because most of the flowers present prominent upper and lower lips. The labiatae have a four-lobed ovary, which changes into four seed-like fruits. There are about 2800 species, mostly herbs or small shrubs, with opposite or whorled leaves and usually square stems. They are found throughout the world in temperate latitudes. Many, such as lavender and thyme, are valued for their fragrance; others, such as mint and peppermint, for their stimulating qualities, and still others, such as savory, basil and marjoram, as aromatics. Many of them possess bitter tonic qualities, and not a few bear beautiful flowers, that make them favorite garden plants.

Labor, AMERICAN FEDERATION OF. See LABOR ORGANIZATIONS.

Labor Day, a day set apart by the executive or legislative bodies of most of the states of the Union, at the solicitation of the labor unions and other industrial bodies, to be devoted to processions and other festivities in the interest of labor and laboring men. The first Monday in September has been agreed upon by many of the states as the day for such celebration.

Labor Legislation. See LABOR ORGANIZATIONS; FACTORY AND FACTORY LEGISLATION.

Labor Or'ganiza'tions, societies of laboring men organized to obtain mutual benefit and protection. These organizations are of two classes, those organized within separate trades,

for the purpose of obtaining benefits for the workmen within those trades alone, and those admitting workmen of all trades and classes, for the purpose of improving the condition of laboring men as a whole. The methods of these two classes of organizations differ in accordance with these purposes. The former rely chiefly upon such direct influences as strikes or collective bargains, while the latter depend upon more indirect means, such as agitation and political action. The former, or *trades unions*, were organized first, appearing in England about the middle of the eighteenth century, and were the result of natural evolution from the ancient guilds (See GUILD). They did not attain great influence in the United States until about 1830, but since that time have constantly grown in numbers and importance. During the period from 1830 to 1850, the tendency was toward the formation of general labor organizations rather than trades unions, but after the latter date, which marks the appearance of the Typographical Union, the laborers in almost every line of trade organized separate local unions. About 1865 a reaction set in, marked by the organization, in 1869, of the Knights of Labor, a general society admitting members of all classes of labor, and including, when at its height, probably 200,000 workmen. Its influence in politics was at times notable, but this very activity also brought it into disrepute, and since about 1885 it has gradually lost influence, being superseded more recently by the American Federation of Labor. This organization, founded about 1887, consists of the federation of trades unions, and it rapidly gained strength, until in 1905 it included nearly 2000 local unions, with a membership of more than 2,000,000. Its policy was, at first, to keep out of politics, but to maintain a continuous agitation through the general and special press and to obtain its demands by means of strikes and conferences. Later, however, it entered politics, devoting itself to securing the nomination and election of candidates favorable

to the laboring classes. It sometimes worked in and through the old parties and sometimes through independent candidates.

The prejudice which formerly existed against labor organizations is rapidly dying out, as the public has learned to know and respect their leaders and has obtained a clearer understanding of their aims and principles. In the furtherance of their original purposes, namely, increasing the intelligence, skill and efficiency of the workmen, the elevation of character, the raising of wages and the improvement of the conditions of employment, the payment of insurance and of benefits to the sick and the general protection of the rights of laboring men, they have accomplished and are still accomplishing a great work. See STRIKE.

Labor Unions. See LABOR ORGANIZATIONS; FACTORY AND FACTORY LEGISLATION.

Labouchere, *lah boo shair'*, HENRY DUPREY (1831-), an English journalist and politician, born in Broom Park, Surrey. He was educated at Eton and entered the diplomatic service, where he remained ten years, part of the time serving at Washington, D. C. He was several times member of the British Parliament, serving continuously for Northampton for more than twenty years. He established *Truth*, a society and political journal, and was also connected with other British papers. As editor of the former, he attained fame by his vigorous criticisms of British policy, especially as an advocate of Irish home rule. He was a member of the commission which investigated the Jameson Raid of 1896, and during the Boer War he was outspoken in his opposition to the British government.

Laboulaye, *lah boo lay'*, EDOUARD RENE LEFEVRE DE (1811-1883), a French jurist and statesman, born in Paris. His early life he devoted to a careful study of European constitutional history, and he attained some distinction by the publication of *Memoir on the History of Landed Property in the West*. He soon after published another work, *Studies of the Civil and Political Condition of Women*, and two years later an *Essay on the Criminal Laws of the Romans*. During the time of Napoleon III he wrote and spoke with great earnestness in favor of liberalism and national spirit in France, and later he directed many ironical but patriotic essays against certain abuses in the government of France under Napoleon, comparing them unfavorably with some institutions in America. Throughout his life he was a prolific author.

Lab'rador, a peninsula on the east coast of British North America, between the Gulf of Saint Lawrence and Hudson Bay. The eastern part, to which, politically, the name Labrador belongs, is under the government of Newfoundland, while the remainder belongs to Canada and constitutes the district of Ungava. See UNGAVA.

Lab'radorite, a mineral found on the coast of Labrador, formerly called *Labrador hornblende*. It is a lime soda feldspar and is distinguished by its remarkable changeability of color. Blue and green are the most common colors, but occasionally these are intermingled with rich flame-colored tints. It is sawed into slabs by lapidaries and is employed in inlaid work.

Labrador Tea, a name given to two plants that grow in the north of Europe and in America north of Pennsylvania. They are species of heath and are low shrubs, with alternate, entire leaves, clothed underneath with rusty wool. The fragrant crushed leaves are used by the natives of Labrador as a substitute for tea.

Labuan, *lah boo ahn'*, a small British colony, consisting of an island on the western coast of British Borneo. It has an area of about thirty square miles and is inhabited chiefly by Malays from Borneo. It is well supplied with water and has a good harbor at Victoria, on its southeast side. Coal of excellent quality is plentiful, but has been mined hitherto with indifferent success. Other products are timber, caoutchouc, gutta-percha, wax and sago. This island was taken possession of by the British in 1844 and is under the government of the British North Borneo Company.

Labur'num, a tree, native of the Alps and cultivated for ornament. It is well and widely known for the beauty of its pendulous racemes of yellow, pea-shaped flowers. The seeds contain a poisonous substance which is called cytisine. The wood is hard and durable and is much prized by cabinetmakers, being wrought into a variety of articles.

Lab'yriuth, a structure having numerous intricate winding passages, which render it difficult to find the way through it. The legendary labyrinth of Crete, out of which no one could find his way, and in which all who entered became the prey of the Minotaur, was said to have been constructed by Daedalus. The hint of this legend was probably given by the fact that the rocks of Crete are full of winding caves. The Egyptian labyrinth was a build-

ing situated in central Egypt, above Lake Moeris, not far from Crocodilopolis (Arsinoe) in the district now called the Fayoum. The building, half above and half below the ground, contained 3000 rooms. Imitations of labyrinths, called *mazes*, were once fashionable in gardens. They were made of hedges.

Lac, a resinous substance produced on numerous trees in India by the secretions of the lac insect. It is formed chiefly by the female insects, each of which inhabits a cell. The insect is a scale-like thing which, after fastening itself to a twig or the bark, draws a resinous substance from the juices of the plant. The insect dies, leaving a multitude of young beneath its shell. These bore their way through the body of their mother and swarm on the bark and immediately commence the secreting of lac, repeating the life history of their parent. In time the bark becomes covered to a depth of half an inch with the gum and the blood-red bodies of the insects. When the bark is put in hot water, the resin melts and the coloring matter is dissolved from the bodies of the insects. In India the cultivation of the lac insect has received much attention. *Shellac* is, the name given to the resin when melted and reduced to a thin crust. Mixed with turpentine, coloring matters and other substances, lac is used to make various kinds of sealing wax. When dissolved in alcohol by different methods of preparation, it is made into various kinds of varnishes and lacquers. Lac dye and lac lake are coloring matters used in dyeing cloth scarlet. The lac insect is nearly related to the cochineal insect.

Lac or **Lak** (from Sanskrit *laksha*), an oriental term representing 100,000. In the East Indies it is especially applied to computations of money. Thus, a lac of rupees equals £100,000.

Laccadives, *lak'ka dive'z*, a group of fourteen small coral islands in the Arabian Sea, about 200 mi. off the coast of Malabar, belonging to British India. The islands are well supplied with fish and export quantities of cocoanut fiber. Cocoanut, cowries, jaggery and plantains, the only other exports, are of little importance. The natives are a race of Mohammedans, called Moplahs, of mixed Hindu and Arab descent. They are bold seamen and expert boat builders. Population, about 14,500.

Lace, *lase*, a delicate kind of network, formed of silk, flax or cotton thread, used for the ornamenting of dresses. Needle laces are called *point*; those made on a pillow by means of bobbins, *cushion*, or *bobbin*, laces.

Specimens of the early Venetian point lace may still be seen in collections. The *point d'Alencon* is the most expensive and complicated of modern needle-laces. Among the cushion laces are the Honiton, made in England; Mechlin, made in Germany; Valenciennes and Chantilly, made in France, and Duchess lace, made in Belgium at Bruges, besides the celebrated Brussels, Venetian and Florentine laces. Guipure lace consists of a network ground, on which patterns are wrought in various stitches with silk. It was originally made in silk, gold or silver thread on little strips of parchment or vellum.

Lace-bark Tree, a native tree of the West Indies. It receives its common name from the fact that when its inner bark is cut into thin pieces and soaked, it assumes a beautiful net-like appearance. It is used by women for ornament, and the negroes manufacture matting from it.

Lacedaemonians, *las'e de mo'ny anz*. See SPARTA.

Lace-winged Flies, insects so called from their delicate wings, which have many netted spaces, like lace. The larvae are exceedingly voracious and feed upon plant lice.

Lachesis, *lak'e sis*. See FATES.

Lachine, *la sheen'*, a village of Canada, in the Province of Quebec. There are at Lachine famous rapids on the Saint Lawrence, which are avoided by means of a canal from Montreal harbor to a point above them. The shooting of the rapids is a favorite trip for tourists. Population in 1901, 5561.

Lachlan, *lak'lan*, a river of New South Wales. It rises in the mountains on the east side of the state, a little south of the central line, flows northwesterly, then southwesterly and joins the Murray. It is 700 miles long, and in the last part of its course it expands into several marshes.

Lachrymal, *lak're mal*, **Glands**, the glands by which tears are secreted. There is one for each eye, and it is situated in a depression in the upper and outer part of the orbit. The fluid secreted is distributed over the inner surface of the upper eyelid by a number of minute ducts and is just enough at ordinary times to keep the mucous membrane and conjunctiva moist. After being spread over the eye by the upper lid, this fluid passes through two small openings near the inner angle of the eye into the lachrymal sac, which is the upper opening of the nasal duct, a small tube about a half inch in length

Lackawanna

that conducts the fluid to the back nasal passage. The secretion of an unusual amount of fluid, such as is caused by irritation of the eye or excessive grief or joy, overflows the lower lid in the form of tears. See EYE.

Lackawanna, *lak a won'nah*, a river of Pennsylvania, rises in the northeastern part of the state and empties into the Susquehanna between Pittston and Wilkesbarre. It is about 50 miles in length and is chiefly important because of the valuable anthracite coal beds in its valley. This region is one of the most valuable coal regions in the United States. Scranton is the chief city on its banks.

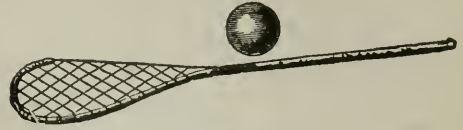
Laconia, N. H., the county-seat of Belknap co., 100 mi. n. of Boston, Mass., on the Winnepesaukee River, between Lakes Winnisquam and Winnepesaukee, and on two lines of the Boston & Maine railroad. It is a prosperous manufacturing city, producing cars, hosiery, lumber and foundry products, paper boxes and other goods. The beautiful lake region, with its cool climate and good fishing, has made the place a popular summer resort. The chief buildings are a public library, an opera house, a hospital, the state home for feeble-minded children and a state fish hatchery. The place was settled about 1780, the town was incorporated in 1852 and the city was chartered in 1893. Population in 1900, 8042.

Lacquer, *lak'ur*, **Ware**, the name of a ware covered with varnish, or *lacquer*. It is manufactured in Japan, China, India and Persia, but the Japanese ware is the best. This remarkable lacquer not only forms a very hard surface, but, unlike other varnishes, it stands a considerable heat without injury, so that in Japan lacquered vessels are used for hot soups and hot alcoholic drinks. The lacquered surface of the best ware is prepared by a very tedious process, owing to the number of coatings it receives. For the finishing coat the best lacquer is employed, and this is polished with calcined deer horn, finely powdered, the finger and a little oil bringing up the final gloss. Many cheap imitations of lacquer ware are placed on the market.

La Crosse, *la kros'*, a game of ball originating with the indians of Canada, played somewhat on the principle of football, by twenty-four persons, twelve on a side, each of whom carries an implement called a *crosse*. The field is as near 125 yards long as possible, and at each end are two goal posts, 6 feet apart and 6 feet high. Whenever either side succeeds in putting the

Lactic Acid

ball between the posts of their opponent's goal, by throwing or striking with the *crosse* or by kicking it, it scores a goal, and the side that scores the most goals within the time fixed for playing, wins. The *crosse* is something like an



CROSSE AND BALL

elongated lawn tennis racket, woven with catgut, which must give a flat surface. In the widest part, the *crosse* should not exceed one foot, but it may be of a length to suit the player.

La Crosse, Wis., the county-seat of La Crosse co., 200 mi. n. w. of Milwaukee, on the Mississippi River and on the Chicago, Burlington & Quincy, the Chicago & Northwestern and other railroads. The city is near extensive forests of pine and hardwood timber and is an important farming, dairying and manufacturing trade center for a large section of the Northwest. Very large lumber mills are located here, and the principal manufactures are agricultural implements, knit goods and flour. The city has more than fifty churches, Washburn Public Library, an asylum for the insane and the Saint Francis and United States Marine hospitals. The place was settled in 1841 and was incorporated in 1856. Population in 1905, 29,078.

Lacteals, *lak'te alz*, **THE**, the lymphatics of the small intestines. The lacteals have their origin in small projections, called *villi*, which are found in the mucous membrane of the small intestines. Each villus has its own lacteal vessel or network of vessels. The lacteals discharge their contents into the *receptaculum chyli*, from which the contents pass to the thoracic duct. The chief office of the lacteals is to absorb the fatty particles of the chyle, which, after they have entered these vessels, change their character. In the intestines, these particles exist in the form of minute drops, while in the lacteals they are found to be as fine as dust and to have changed from the kind of fat that was eaten—tallow, butter or lard—to the fat of the animal in whose lacteals they are found. See THORACIC DUCT.

Lactic Acid, an acid found in several animal liquids, in milk when it becomes sour, in the fermentation of several vegetable juices and in the putrefaction of some animal matters. It is a colorless, inodorous, very sour liquid, of a syrupy consistence. It has some use as a medi-

cine, particularly in dissolving the membrane in diphtheria.

Ladd, GEORGE TRUMBULL (1842—), an American educator and psychologist, born at Painesville, Ohio. He was educated at Western Reserve College and Andover Theological Seminary. On completing his education, he served as pastor of churches in Edinburgh, Ohio, and Milwaukee, Wis., and then became professor of philosophy at Bowdoin College. From here he was elected to a similar position at Yale, where he succeeded President Porter as professor of moral philosophy. Professor Ladd is widely known in the United States and Europe through his writings and lectures on psychology, and he is considered one of the leading authorities on this subject from the physiological point of view. He is the author of numerous works on psychology, a number of which have been translated into foreign languages. Among the best known of these are *Elements of Physiological Psychology*, *Outlines of Physiological Psychology*, *Primer of Psychology*, *Introduction to Philosophy*, *Philosophy of Mind*, *Philosophy of Knowledge* and *Psychology*, *Descriptive and Explanatory*.

Ladoga, *lah'do ga*, a lake in northwestern Russia, over 7000 sq. mi. in area. It is the largest lake in Europe. The navigation is dangerous for small craft, but the lake is very important commercially, and canals along its southern shore connect the rivers Volkhov and Neva. The fishing is important.

Ladrone' Islands or **Mariana Islands**, a group of sixteen islands in the Pacific Ocean, east of the Philippines and the Caroline Islands. Guam is the southernmost and largest; next in importance are Saipan, Tinian and Rota. The islands are mostly of volcanic origin and are very rugged, but their general aspect is picturesque, as they are densely wooded and covered with a perpetual verdure. The soil is extremely fertile. The islands were discovered by Magellan in 1521. Excepting Guam, which belongs to the United States, the whole group was sold by Spain to Germany in June, 1899. See GUAM.

Ladybird, the name of a number of small insects, or beetles, common on trees and plants in gardens. They are usually rounded in form, many of them of bright colors, ornamented with black or scarlet spots. They are of great service to vegetation on account of the number of aphides, or plant lice, which they destroy.



LADYBIRD

La'dysmith, a town in Natal, South Africa, on the Klip River, 84 mi. n. w. of Pietermaritzburg, with which it is connected by rail. In the Boer War the British Army, commanded by Sir George White, was besieged here from October, 1899, to February 28, 1900. Population, estimated at 3000.

Lady's Slipper, one of a genus of beautiful orchids (cypripedium), several species of which are natives of the United States. The lip of the corolla is large and inflated, resembling a slipper. Our species are either yellow or white, or white mottled and striped with pink. Foreign species differ from American greatly, both in shape and color. See ORCHIDS; FLOWERS, color plate, Fig. 1.



LADY'S SLIPPER

La Farge, la fahrzh', JOHN (1835—), an American painter, born in New York. He went abroad and studied in Paris. After his return to America his first work was done on the mural decorations for Trinity Church, Boston. After this he directed his attention to the art of glass painting and window designing and became associated with Saint Gaudens in the building of the King's Sepulcher Monument at Newport, R. I. In 1887 he executed one of his finest works, the large altarpiece in the Church of the Ascension, New York. The subjects which La Farge undertook are numerous and varied, including portraits, landscapes and religious subjects. Among his best paintings are *The Arrival of the Magi* and decorations in the Brick Church, New York, and the Congregational church, Newport, R. I.

Lafayette, *lah ja yet'*, IND., the county-seat of Tippecanoe co., 64 mi. n. w. of Indianapolis, on the Wabash River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Wabash and other railroads. The city has a beautiful location on the bluffs and terraces of the river and is surrounded by an agricultural region. The manufactures include boots, shoes, wagons, bicycles, bridges, agricultural implements and many other articles. The city is the seat of Purdue University, has a good high school, a public library, Saint Elizabeth's Hospital and Saint Joseph's orphan asylum. The city was built near the site of the French fort, Post

Lafayette

Oniatanon, which was constructed about 1720. The fort was taken by the British in 1760, but was captured by the indians the next year. Lafayette was settled in 1820 and was incorporated in 1854. Population in 1900, 18,116.

Lafayette, MARIE PAUL JEAN ROCH YVES GILBERT MOTIER, Marquis de (1757-1834), a



MARQUIS DE LAFAYETTE

French general and statesman. He began his career at the court of Louis XV, at the period when hostilities were commencing between Britain and the American colonies. In 1777 he left France for America, having fitted out a vessel for himself, and was received most cordially by Washington and his army. He was made a member of Washington's staff, with the rank of major general, was wounded at Brandywine and commanded the vanguard of the American army at the capture of Cornwallis. He returned to France on the close of the campaign, was called to the Assembly of the Notables, and in 1789 was elected a member of the States-General, which he was partly instrumental in converting into the National Assembly. In the Assembly he proposed a declaration of rights and the decree providing for the responsibility of the officers of the Crown. Two days after the attack on the Bastille, he was appointed commander in chief of the National Guards of Paris. It was through his means that the king

Lafontaine

and queen were saved from the mob that had taken possession of the palace at Versailles. His popularity was not great with any party in the state; he was too moderate for the radicals and too liberal for the court party.

After the adoption of the constitution of 1790, Lafayette resigned all command and retired to his estate of La Grange. In 1792 he was appointed one of the three major generals in command of the French armies and directed some small operations on the frontier of Flanders, at the same time striving unsuccessfully to overthrow the Jacobins at Paris. Commissioners were sent out by the Jacobins to arrest him, and he determined to leave the country and take refuge in some neutral ground. He was captured by an Austrian patrol and confined at Olmütz till 1797, when Napoleon procured his release; and on his return to France he took little part in public affairs, on account of his opposition to the Consulate and the Empire. In 1818 he was chosen a member of the Chamber of Deputies and was a constant advocate of liberal measures. In 1824 he visited the United States and was received with great enthusiasm. Congress voted him \$200,000 and a township of land. During the revolution of July, 1830, he was appointed general of the National Guards of Paris, and it was chiefly to him that Louis Philippe owed his elevation to the throne.

La Follette, *la fol'let*, ROBERT MARION (1855-), an American lawyer and politician, born at Primrose, Wis. He graduated at the University of Wisconsin in 1879, was admitted to the bar in the following year, immediately became district attorney of his county and served for two terms. In 1885 he was elected member of Congress and during a service of six years attained prominence as an orator and for a conspicuous part in the framing and advocacy of the McKinley tariff law. He was elected governor of his state in 1900 and was twice reelected, resigning in 1905 to accept an election to the United States Senate. Before and during his governorship he led a successful movement for the direct nomination of candidates for office, for the taxation of railway property at the same rate as other taxable property and for the control of railway rates within the state by a commission. (See illustration on next page.)

Lafontaine, *lah'fon tane'*, JEAN DE (1621-1695), a French writer. His early verses won him influential friends, who induced him to go

to Paris and provided for him while there. He enjoyed the friendship of Molière, Boileau, Racine, and all the first wits of Paris, by whom he was much beloved for the candor and simplicity of his character. But he was no favorite with Louis XIV, who even hesitated some time



ROBERT M. LA FOLLETTE

to confirm his nomination to the French Academy. The first volume of his *Tales* appeared in 1664, a second in 1671. Of his *Fables*, innumerable editions have been printed, and it is through them that he is universally known.

Lago Maggiore, *lah'go ma jo'ray*. See MAGGIORE, LAKE.

La'gos, a British colony in western Africa. It consists of a strip of land along the Gulf of Guinea, and its area is about 3460 square miles. The chief article of commerce is palm oil. Acquired by Britain in 1861, Lagos and the Gold Coast were for some time under one governor; but in 1886 Lagos was put under an independent administrator of its own. Its capital is the town of the same name. Population, about 1,500,000.

Lagos, *lah'gos*, a city of Mexico, on the Mexican Central railroad. It was founded by Francis Comartel in 1563 and was named Lagos de Moreno from the name of its defender, Pedro Moreno, who died in the War of Independence. The city contains a number of noted churches, and there are valuable silver

mines in the vicinity. Population in 1895, 14,716.

La Guayra, *la gwi'ra*, the chief seaport of Venezuela, situated about 5 mi. from Caracas, of which it is the port. The chief objects of interest are a statue of Vargas, a celebrated physician of La Guayra, several churches and hospitals. The harbor has been improved recently and is protected by a fort. The chief industries are manufactured goods and exports of coffee, cocoa and skins. The port is connected with Caracas by a railroad 29 miles long. It was founded in 1588. Population, 9000.

Lahore', a city of British India, capital of the Punjab and administrative headquarters of Lahore division and district. The native town is surrounded by a brick wall 15 feet high, flanked by bastions. The streets of the native town are exceedingly narrow, unpaved and dirty, and the houses have, in general, a mean appearance. The European quarter lies outside the walls on the south and dates from 1849. Among the public buildings and institutions are the Punjab University, the Oriental College, a medical school, a law school, Mayo Hospital and Lawrence and Montgomery halls. Its most important industry is the manufacture of carpets. In 1524 Lahore became the seat of the Mogul Empire, under which it reached its greatest splendor. Before passing into the hands of the British, it was the capital of the Sikhs. Population in 1901, 120,058.

Laing, *layng*, ALEXANDER GORDON (1793-1826), a British traveler and explorer, born in Edinburgh. After serving in the army and attaining the rank of major, he entered, in 1822, on his career as an African traveler. The results of his early journeys in West Africa were published in 1825. He explored the upper course of the Niger, and was assassinated by his guide near Timbuktu.

Laisser Faire, *lay say fair'*, in economics, a term applied to the theory that a public authority should interfere in the concerns of a community as little as possible; that wealth tends to be produced most peaceably and economically where a government leaves individuals free to produce and distribute on mutually arranged terms. This rule in practice has various exceptions, as in matters of education and the employment of children and the promotion of health or morality.

Lake, a large sheet or body of water, wholly surrounded by land, having no direct or imme-

diating communication with the ocean or with any seas or having such only by means of rivers. A lake differs from a pond in being larger. Lakes are divided into four classes: (1) Those which have no outlet and receive no running water, usually very small. (2) Those which have an outlet, but receive no running waters on the surface and are consequently fed by springs. (3) Those which receive and discharge streams of water, by far the most numerous class. (4) Those which receive streams and have no visible outlet, being generally salt, as the Great Salt Lake, the Caspian Sea and the Aral Sea.

Lake Charles, LA., the parish-seat of Calcasieu parish, 216 mi. w. of New Orleans, on the Southern Pacific, the Kansas City Southern and other railroads. The city has a beautiful location on the Calcasieu River and on the shore of Lake Charles, between the great rice fields and the forests of long-leaved pine, and has extensive rice, cotton and lumber mills and other industries. It is the seat of Acadia College. The place was settled in 1849 and was incorporated in 1860. Population in 1900, 6680.

Lake City, FLA., the county-seat of Columbia co., 60 mi. w. of Jacksonville, on the Atlantic Coast Line, the Sea Board Air Line and other railroads. It is the seat of the state agricultural college and of a United States agricultural experiment station. The town is surrounded by a cotton-growing region and has a considerable trade in cotton, lumber, turpentine, phosphates and fruits. Population in 1900, 4013. The municipal limits were extended in 1901, and the population was estimated in 1902 at 6000.

Lake Dwellings, a name commonly applied to the prehistoric dwellings of which numerous remains have been found in the lakes of Switzerland and other parts of southern Europe. These remains were not known until 1853 and 1854, when the discoveries were first made in a lake near Zurich. Since then other similar discoveries have been made which show that some of these villages built on piles in the water were constructed during the Stone Age, that others were built after iron was in use and that a period of three or four thousand years must have elapsed between the building of the first and the last of those now known. In some places the huts were built on islands which the prehistoric man had built, and in other cases piles made of sharpened tree trunks were

driven into the bottom of the lake, platforms built upon the tops of the piles and the houses constructed upon the platforms. Remains of various grains and some fruits have been found, and it has been proven that these people had herds of cattle and goats and knew something of the manufacture of pottery.

At the present time there are people in South America, as seen in Lake Maracaibo, who dwell in separate houses on tall piles.

Lake of the Woods, a lake on the southern frontier of British America, on the northern border of Minnesota, 190 mi. w. n. w. of Lake Superior. It is 65 miles in length and has an extremely irregular form and a coast line of about 300 miles. It is studded with numerous wooded islands. Rainy River, the principal feeder of the lake, enters it at its southeastern extremity; its discharge is at the north by the Winnipeg River.

Lakes, GREAT. See GREAT LAKES.

Lake School or Lake Poets, a name given by the *Edinburgh Review* to Wordsworth, Coleridge and Southey, because they lived in the Westmoreland and Cumberland lake district. They had little in common except their non-classicism.

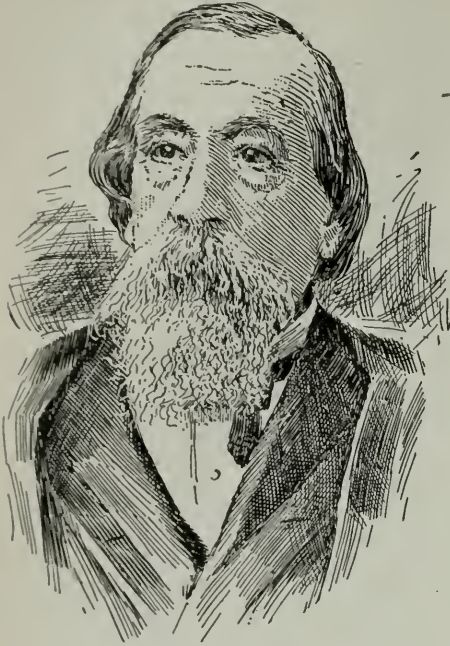
Lak'hnau. See LUCKNOW.

Lamaism, *lah'mah iz'm*, a variety of Buddhism dating from the seventh century after Christ and prevailing chiefly in Tibet and Mongolia. It is named from the *lamas*, or priests, belonging to it. The highest object of worship is Buddha, who is regarded as the founder of the religion and the first in rank among the saints. In the priesthood there are two heads, the *Dalai-lama* and the *Tesho-lama*, in whom Buddha is supposed to be incarnate. The *Dalai-lama* and *Tesho-lama* are equal in rank and authority in name only, for the former, possessing a much larger territory, is in reality much the more powerful. His residence is at Potala, near Lassa, and he is the acknowledged head of the Buddhists, not only in Tibet, but throughout Mongolia and China. See BUDDHISM.

Lamar, *la mahr'*, LUCIUS QUINTUS CINCINATUS (1825-1893), an American lawyer, politician and jurist, born in Putnam County, Georgia, educated at Emory College and admitted to the bar in 1847. He moved to Mississippi and was elected representative in 1856. In 1861 he resigned and joined the Confederate army as lieutenant colonel, but later spent two years in Europe as unofficial

Lamarck

representative of the Confederacy. He was professor of law in the University of Mississippi,



LUCIUS Q. C. LAMAR

1867-1872, when he was again sent to Congress, becoming senator in 1876. He was reelected in 1882, but in 1885 became secretary of the interior in President Cleveland's cabinet. He was later appointed associate justice of the Supreme Court of the United States. During his political career his single purpose was to effect complete reconciliation between North and South, and he did much to accomplish this end. He was a brilliant orator.

Lamarck, *la mahrk'*, JEAN BAPTISTE PIERRE ANTOINE DE MONET (1744-1829), a French naturalist. He was educated for the Church, but entered the army and served in the Seven Years' War. Disabled by an accident, he repaired to Paris and devoted himself to the study of medicine and physical science. He gave the name Jardin des Plantes to the royal botanical garden. His chief works are *Philosophie Zoologique*, a work in which he introduced great reform in the classification of animals and set forth a theory foreshadowing what is now known as the law of evolution; *Histoire Naturelle des Animaux Vertebres*, and *Tableau Encyclopedique de la Botanique*.

Lamartine, *lah mahr teen'*, ALPHONSE DE (1790-1869), a French poet and statesman.

Lamb

By his first production, *Poetic Musings*, he at once obtained a high place among the poets of the day. In 1820 he was attached to the legation at Naples, and married a rich English lady, Miss Birch. The *New Poetic Musings* and the *Poetic and Religious Harmonies* established his poetic fame and obtained for him admission into the French Academy. After the Revolution of 1830 he traveled in the East, and on his return he published *A Voyage in the East*. During his absence he had been elected a member of the Chamber of Deputies, and thenceforward his career was as much political as literary. In 1847 he published his *History of the Girondins*, in which he manifested strong republican leanings. After the February revolution of 1848 he became a member of the provisional government, in the capacity of minister of foreign affairs. For some months he enjoyed unbounded popularity, and his energetic behavior was on more than one occasion the means of averting incalculable evils. After the insurrection of June, 1848, he lost his popularity, and in 1851 he withdrew from public life. He was latterly much impoverished and was finally voted an annuity.

Lamb, *lam*, CHARLES (1775-1834), an English poet, essayist and humorist. He was educated



CHARLES LAMB

at Christ's Hospital, where he formed his lifelong friendship with Coleridge. After leaving

Lambayeque

school, the greater part of his life was devoted to the safe-keeping and care of his sister Mary, who in a fit of acute mania had stabbed her mother fatally. Charles refused to allow her to be confined permanently in an asylum, and except during attacks of her mania, she was in his home. His first appearance as an author was in 1798, when he published a number of poems, in conjunction with his friends, Coleridge and Lloyd. These attracted little attention, nor was he more successful with his two attempts at the drama, *John Woodville*, written in imitation of the early English dramatists, and a farce entitled *Mr. H.* His *Tale of Rosamund Gray*, although it was well received, did not bring him fame; but with the publication of his *Tales from Shakespeare*, written in conjunction with his sister Mary, he came at once into popular favor. *The Adventures of Ulysses* followed, and in *Specimens of English Dramatic Poets Contemporary with Shakespeare*, he brought to public notice the almost unknown lesser dramatists of the sixteenth century. He owes his chief literary distinction, however, to his delightful *Essays of Elia*, contributed chiefly to the *London Magazine*. Here, in a style ever happy and original, he has carried the short humorous essay to a point of excellence perhaps never before attained.

Lambayeque, *lahm'ba yay'kah*, a town in Peru, capital of the department of the same name, situated on the river Lambayeque, six miles from the sea. Its industries consist chiefly in the manufacture of cotton and woolen goods. Population, estimated at 8000.

Lam'bert's Pine, a pine growing in California, sometimes reaching the height of 300 feet. It yields, when burned, a sugary substance, known as California manna. The leaves are in fives; the cones are fourteen to eighteen inches long and contain edible seeds.

Lam'bertville, N. J., a city of Hunterdon co., on the Delaware River and on the Pennsylvania railroad. Its industries include the manufacture of flour, paper and wooden and rubber articles. It is connected by a bridge with Newhope. Population in 1905, 5016.

Lam'enta'tions, the name of a book in the Old Testament in the Authorized Version of the Scriptures, occupying a place between the books of *Jeremiah* and *Ezekiel*. *Lamentations* is a poem in five chapters, which, with the exception of the fifth, are arranged in verses corresponding to the letters in the Hebrew alphabet. In chapters one, two and four the

Lamp

verses are arranged alphabetically. In chapter three the first three verses begin with the first letter of the alphabet, the second three with the second, and so on. This chapter has sixty-six verses, while the first, second and fourth have twenty-two verses each, the number of verses corresponding in this case to the number of letters in the alphabet. The fifth chapter is not alphabetically arranged and is supposed by some critics to have been written by another author, though the entire book is generally ascribed to the prophet Jeremiah. *Lamentations* treats of the destruction of Jerusalem and the suffering of its defenders, while it laments the catastrophe, especially because it was brought on by the sins of the people.

Lammergeier, *lam'mur gi'ur*, sometimes called the *bearded vulture*, a bird of prey which occupies an intermediate position between the eagles and the vultures. It is found in the Swiss and German Alps, as well as in the higher mountains of Asia and Africa, and is the largest European bird of prey. It is about four feet in length and has a wing expansion of from nine to ten feet. It preys on small quadrupeds, on chamois, lambs and hares, but does not refuse dead and decaying meat.

Lamont', DANIEL SCOTT (1851-1905), an American lawyer and politician, born in Courtlandville, N. Y., and educated at Union College. He did not graduate, but entered journalism at Albany, and in 1883 he became private secretary to Governor Grover Cleveland. He continued in this position after Cleveland became president, and upon his second election Lamont was made secretary of war. At the close of his term in 1897, Lamont was elected vice-president of the Northern Pacific Railway.

Lamp, a device for producing an artificial light. Originally the lamp consisted of a vessel for holding an inflammable fluid in which a wick was suspended, but now the term is applied to any arrangement for illuminating purposes, whether it uses gas, electricity or an illuminating fluid. The first lamps had shells or the skulls of animals for cups, and reeds or rushes for wicks. The fluid usually consisted of the fats of animals, but later oils from plants came into use and were more acceptable, because they remained liquid at a lower temperature. Cloth or a roll of tow was finally substituted for rushes as wicks. Lamps of this sort gave a dim light, made a great deal of smoke and were not very satisfactory.

In the latter part of the eighteenth century a

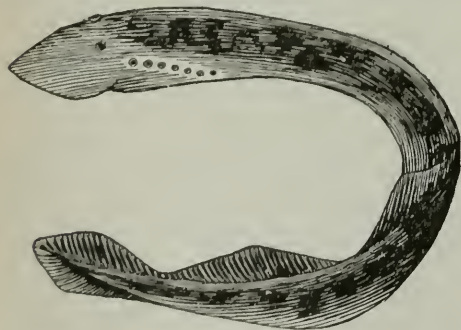
Lampblack

Frenchman named Argand invented a burner which used a flat wick in a round tube, so arranged that the air could pass through the tube and reach the center of the flame. This improvement is the greatest ever made in the lamp. With the introduction of kerosene came further changes. The wick was made broad and flat, and the flame was enclosed in a glass chimney, resting upon a perforated bottom. This arrangement caused a good circulation of air about the flame.

The ancients regarded the lamp as a symbol of wisdom and as a sacred emblem. The candlestick which stood in the Tabernacle of the Jews, and later in the Temple, was a stand for holding lamps, and the lamp is still found in Catholic churches and those of some other denominations. The Roman lamp also frequently adorns the title pages of books and diplomas given by educational institutions.

Lamp'black, a fine soot, formed by the condensation of the smoke of burning oil, pitch or resinous substances, as in a chimney. It is used in the manufacture of pigments, blacking and printing inks. See CARBON.

Lam'prey, the popular name of several species of eel-like, scaleless fishes, which inhabit



LAMPREY

both fresh and salt water. The lampreys have seven apertures on each side of the neck and an aperture on the top of the head. The mouth is in the form of a sucker, lined with strong teeth and cutting plates. The *marine*, or *sea*, lamprey sometimes reaches a length of three feet and a weight of five pounds. It is of a dusky brown, with yellowish patches, is common round the British coasts and is also found in the Mediterranean. It ascends rivers in the spring for the purpose of spawning and was formerly much valued as an article of food. The *river lamprey*, or *lampern*, is a smaller species and abounds in the fresh-water lakes and rivers of northern

Lancaster

countries. It is often seen clinging to stones with its mouth. It is black on its upper parts and of a silvery hue on its under surface. Lampreys attach themselves to other fishes, such as the shark, sturgeon or salmon, and suck their blood; they also eat soft animal matter of any kind. See HAGFISH.

Lan'caster, ENGLAND, the county-town of Lancashire, 45 mi. n. e. of Liverpool. There is in the town an ancient castle, now used as the county jail, built in the reign of Edward III, but with a keep supposed to be Saxon and with a tower on the southeast attributed to the emperor Hadrian. The industries comprise the manufacture of furniture, sailcloth, cotton goods, floor cloth, oil and varnish. Population in 1901, 40,300.

Lancaster, OHIO, the county-seat of Fairfield co., 30 mi. s. e. of Columbus, on the Hocking River and the Hocking Canal and on the Cincinnati & Muskingum Valley and the Hocking Valley railroads. The city is in the natural gas belt and is surrounded by a rich agricultural region. The shipping facilities are good, and the city is the seat of railroad shops and manufacturing of agricultural implements, foundry products, carbons, flour, shoes and glass. The state industrial school for boys is located here. The place was settled in 1800. Population in 1900, 8990.

Lancaster, PA., the county-seat of Lancaster co., 68 mi. w. of Philadelphia, on the Conestoga River and on the Philadelphia & Reading and the Pennsylvania railroads. The city is the seat of large tobacco factories and extensive manufacturing of cotton, iron and steel goods, shoes and other articles. Franklin and Marshall College is located here and one of the state normal schools is at Millersville, near the city. The public institutions include the Lancaster General and Saint Joseph's hospitals, the Children's and Stevens's homes and several libraries. Other features of interest are the Soldiers' Monument and Witmer's stone bridge. The place was settled about 1718 and was called Hickory Town until 1729. From 1799 to 1812 it was the capital of the state. It was chartered as a city in 1818. Population in 1900, 41,459.

Lancaster, HOUSE OF, the name used in English history to designate the line of kings immediately descended from John of Gaunt, fourth son of Edward III. Henry IV, who received the crown on the enforced abdication of Richard II (1399), was the first king of this House and established a strong government,

which was continued under his successor, Henry V. Henry VI was a weak king, and during his rule arose the Wars of the Roses. See HENRY IV; HENRY V; HENRY VI; ROSES, WARS OF THE; YORK, HOUSE OF.

Lancaster, JOHN OF GAUNT, Duke of. See JOHN OF GAUNT.

Lancaster Sound, a passage leading from Baffin's Bay to Barrow's Strait. It was discovered by Baffin in 1616. It is about 250 miles long and 65 miles wide.

Lance, *lans*, a weapon consisting of a long shaft with a sharp point. It was common among the Greeks and Romans. The Macedonian phalanx was armed with it, and it was the chief weapon of the Roman infantry. The lance was the chief weapon in the Middle Ages and was especially the arm of knighthood. The introduction of firearms gradually led to the disuse of the lance in the west of Europe, though it continued in the east. Napoleon organized several regiments of Polish lancers for service in his army, and now most of the armies of Europe have regiments of Uhlans, or lancers.

Lancelot, *lan'se lot*, of the **Lake**, the name of one of the knights celebrated in the traditions and fables relating to King Arthur and the Round Table. According to tradition, Lancelot was of royal birth, was educated by the Lady of the Lake and was taken by her to Arthur's court, where he became one of the chief knights. His love for Guinevere, the beautiful wife of Arthur, and his disregard of Morgana, a fairy and the sister of Arthur, placed the knight in the most dangerous and marvelous situations, from which, however, he always extricated himself by his valor and the help of the Lady of the Lake. Elaine, the maid of Astolat, loved Lancelot and died of her love. Lancelot is one of the chief figures in Tennyson's *Idylls of the King*, and the love between him and Guinevere is the main thread of the series.

Lancet, *lan'set*, **Fish**, one of the largest and most formidable of deep-sea fishes, found both in the Atlantic and the Pacific. The bodies are long and scaleless, and the snout is prolonged, the mouth being supplied with long fangs and small teeth. They vary in length from two to four feet and have sharp spines, one on each side of the tail. The Pacific species is known as the handsaw fish, from the saw-like ventral fin. Still another species is called the wolf fish.

Lancewood, *lans'wood*, the popular name of the wood of several tropical trees of the same order, which possesses in a high degree the

qualities of toughness and elasticity and is on this account extremely well adapted for the shafts of light carriages, fishing rods and all those uses where light, strong, but elastic timber is required.

Land and Sea Breezes, the name of daily winds, which blow alternately on and off shore. During the day the land becomes heated to a higher temperature than the sea, and a little before noon a breeze begins to blow landward. This increases in strength until about the middle of the afternoon, when it gradually subsides. During the night the land radiates heat rapidly and becomes cooler than the sea, so that after midnight in most localities a breeze sets in, blowing off shore and continuing until about sunrise. Land and sea breezes are regular occurrences in the tropical regions that are free from local storms, and they are gentle winds. In the temperate latitudes they are not as regular, since they are liable to be disturbed by local conditions. Similar breezes occur along the shores of the Great Lakes and other large bodies of fresh water, though they are not as distinctly marked as the true land and sea breezes.

Land Crab, a species of crab which takes its name from the fact that when full-grown it lives upon the land. The family is large and includes a number of genera, all of which live in warm countries. The land crab resembles common crabs very closely. All species breathe by gills, and some of them inhabit dry places and burrow in the sand or the earth. They are supposed to carry their eggs to the water and for this reason make periodical migrations to the sea or other near bodies of water. Among the most common species are the *black crab*, or *mountain crab*, of the West Indies. It lives in the woods and hills and is often found two or three miles from shore, but regularly visits the sea in the months of April and May. Nearly all species are active during the night, and except in rainy weather they remain concealed during the day. Some of the species are esteemed for food, and the eggs are also considered a delicacy. Land crabs generally feed upon plants, and in some localities they are destructive to sugar cane and other agricultural plants. See CRAB.

Landgrave (German, *Landgraf*), in Germany, about the twelfth century, the title assumed by certain counts, to distinguish them from the inferior counts under their jurisdiction. There were at first three landgraves, the princes of the territories of Thuringia, Lower Alsace and Higher Alsace.

Land League, an organization projected in 1879, by Charles Parnell, the leader of the Irish national movement, the ostensible object of which was to purchase the land of Ireland for the people of Ireland. Funds were largely subscribed, especially in America, but the league's lawless decrees against landlords and tenants who held aloof from it, and the alleged complicity of its members with many terrible outrages, caused it to be suppressed in 1881. After the suppression of the Land League a political and agrarian organization, called the *National League*, was formed. Its main objects are the reform of the land laws, the weakening of the power of the landlords, the increase of peasant proprietors and a semi-independent government for Ireland.

Landlord and Tenant. See LEASE; TENANT.

Lan'dor, WALTER SAVAGE (1775-1864), an English poet and prose writer. He was educated at Rugby and Oxford, from both of which he was expelled for unruliness. In 1795 he issued a small volume of poems, and in 1798 he published a lengthy poem, *Gebir*, which he afterwards translated into Latin. His fame chiefly rests on his *Imaginary Conversations* between celebrated persons of ancient and modern times, which is a model of a pure, vigorous, finished English style.

Lands, PUBLIC, a part of the national domain which is owned exclusively by the government and is subject to its sale or disposal. It consists wholly of land secured from other nations by treaty, from the states by cession and from Indian tribes by treaty, cession and conquest. At the organization of the national government there were no public lands, except those under the jurisdiction of the several states or claimed by them. This, however, included a large territory northwest of the Ohio River, known as the Northwest Territory. Before the adoption of the Articles of Confederation the several states ceded to the national government all their claims to this territory, and at that time the first public domain was created. Soon afterward North Carolina, Georgia, South Carolina and Virginia ceded their claims to other lands south of the Ohio River and west of the Alleghanies. In 1803 the United States gained by the Louisiana Purchase (including Oregon) more than 1,000,000 square miles. In 1819, by the acquisition of Florida, it secured some 60,000 square miles. By the annexation of Texas in 1845, the public domain received an addition of

262,000 square miles. At the close of the Mexican War in 1848 the present territory of New Mexico and California was added, with a total area of 523,800 square miles. In 1853, by the Gadsden Purchase, 36,200 square miles was added, and in 1867, with the purchase of Alaska, another increase of 577,000 square miles was secured. The part of this vast territory which has been reserved by the general government at the time of the organization of states and territories is known popularly as the *public lands*.

Six methods of disposing of these lands have been followed, of which the most important in the early years of the government was that of gift and special grant. These were of several kinds: those made to individuals by reason of special service; those made to the states for the purpose of encouraging education or building public roads or railroads; those made to the railroads and other corporations as an inducement to develop the resources of the country. The government also disposed of its lands by sale, at first in large quantities for a nominal sum, and later in smaller quantities for reasonable compensation. It has also sold them at public auction, the minimum price accepted being \$1.25 per acre. It has granted them by preëmption. According to this scheme persons who desire to secure lands for farming or some other direct use, may settle upon the land, live there for six months and at the end of that time, by paying \$1.25 per acre, receive the clear title to the property. This law has been repealed. The Homestead Laws provide a somewhat different course of procedure. They require a residence of five years upon the land, when the title will pass to the occupant upon the payment of a nominal fee, rarely more than \$30. The maximum amount granted to any one settler or head of a family is 160 acres. By the so-called Timber Culture Act of 1878, which has recently been repealed, any person who proved that he had planted a certain number of acres of land with timber would receive a patent for not more than 160 acres.

The management of the public lands rests with a bureau of the department of the interior, known as the General Land Office, presided over by a commissioner appointed by the president. He has charge of the survey and disposal of the land and carried on the work through "land offices" scattered throughout the states. The survey of the public lands is made according to the so-called rectangular system, which was first adopted



A DISTINGUISHED MEMBER OF THE HUMANE SOCIETY — *Landseer*
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Landscape Gardening

in surveying the lands in the Northwest Territory, about 1790. It provides for the division of lands into ranges, townships, sections and quarter-sections. The ranges extend in a north and south direction and are numbered east and west from a principal meridian. These ranges are 6 miles wide and are divided into townships 6 miles square, which are numbered north and south from a certain parallel. The townships are subdivided into sections, each one mile square and numbered according to a uniform system. Each section is divided into quarter-sections, which are designated by their direction from the center, as northwest, southwest, northeast and southeast. It is therefore possible to designate any plot of land as small as 40 acres (and even less) with perfect accuracy.

According to the latest report of the commissioner of the General Land Office, there are still unappropriated and unreserved public lands in the United States, to the amount of 817,527,157 acres. Of these, more than 368,000,000 are in Alaska. Of the other states and territories, Nevada contains the greatest area of unappropriated public land, with 61,000,000 acres. Montana contains 55,000,000; New Mexico, 52,000,000; Arizona, 47,000,000; Utah, Wyoming, Idaho, California and Colorado follow in the order named, each with more than 30,000,000 acres still untaken. Besides this land, the government has reserved for its own purposes more than 183,000,000 acres. Up to July 1, 1905, 808,000,000 acres had been appropriated. In a single year as many as 13,000,000 acres have been disposed of. See HOMESTEAD LAWS.

Land'scape Gardening, the art of laying out grounds, arranging trees, shrubbery and flowers, so as to bring into harmonious combination all the varied characteristics of a park or lawn. It disposes flowering plants, shrubs and trees over varying levels, in such a manner as to produce the most pleasing effects; it shuts out undesirable views by means of judicious planting, and it introduces rock work, water and other artistic embellishments, where the local peculiarities of the ground permit. Landscape gardening has become a distinct art, and landscape gardeners of great skill are employed to lay out city parks and other public grounds. See HORTICULTURE.

Land'seer, EDWIN, Sir (1802-1873), a famous English painter, born in London. He began to draw animals when a mere child, and at the age of twelve he was able to paint with great skill. In 1825 he went to Scotland to visit Sir

Langland

Walter Scott, whom he painted with his dogs. After this he rapidly rose to fame, producing pictures of animals painted with so much sentiment and feeling that they seemed almost human. In 1831 Landseer became a member of the Royal Academy and later was knighted. Among his best known works are *Dignity and Impudence, Alexander and Diogenes, A Distinguished Member of the Humane Society, Connoisseurs, The Return from Deer Stalking, High Life and Low Life, Highland Drover Departing from the South, The Return from Hawking, The Shepherd's Chief Mourner, There's Life in the Old Dog Yet, The Stag at Bay and Dialogue at Waterloo*. The fine engravings made by his brother Thomas have made Landseer's paintings well known to the public.

Land's End, a headland in Cornwall, the westernmost point of England. There is a lighthouse on the dangerous rocks, the Longships, about a mile to the west.

Landsturm, *lahnt'stoorm*. See ARMY, subhead *German Army*.

Land Survey, *sur'vay*. See LANDS, PUBLIC.

Landwehr, *lahnt'vair*. See ARMY, subhead *German Army*.

Lan'franc (about 1005-1089), the first archbishop of Canterbury after the Norman Conquest, born at Pavia. He founded a law school in France and in 1046 was chosen prior of the Benedictine monastery of Bec. William of Normandy made Lanfranc prior of Saint Stephen at Caen, as a reward for procuring the pope's consent to William's marriage to his cousin, and in 1070 he made him archbishop of Canterbury. Among Lanfranc's writings are *Commentaries on the Epistles of Saint Paul, A Treatise against Berenger and Sermons*.

Lang, ANDREW (1844-), an English miscellaneous writer. He was educated at Edinburgh Academy, Saint Andrew's University and Balliol College, Oxford, where he took a distinguished position. A most versatile writer, he has published several volumes of ballads and other light verse; *Custom and Myth*, a valuable contribution to the science of comparative mythology; translations of Homer (with collaborators), of Theocritus and of Bion; *Letters to Dead Authors and Letters on Literature*, and several volumes of selected fairy tales.

Lang'land, WILLIAM (about 1332-1400?), the supposed author of the English poem, *The Vision of Piers Plowman*. The poem is allegorical in form and satirical in spirit; the trials and troubles of life generally, but more

particularly the corruptions of the Church and the worldliness of the ecclesiastical order, are its theme.

Lang'ley, SAMUEL PIERPONT (1834-1906), an American scientist and astronomer, born at Roxbury, Mass. He was educated in the Boston Latin School and also studied in Europe. He was successively assistant in Harvard observatory, professor of mathematics in the Naval Academy at Annapolis and director of the Allegheny Observatory. He became secretary of the Smithsonian Institution in 1887. Professor Langley made special observations which have added substantially to our knowledge of the sun's heat. He also extended the invisible portion of the solar spectrum and invented the bolometer, a very delicate instrument for measuring radiant heat. For several years he gave his attention to aerial navigation and was granted an appropriation of \$5,000 by Congress for experiments. See FLYING MACHINE.

Lang'try, MRS. LILLIE (1852-), an English actress, born at Le Breton, on the island of Jersey, the daughter of a clergyman. After her marriage to Edward Langtry in 1874, she became conspicuous in English society, being known as the "Jersey Lily," on account of her beauty. In 1881 she made her début in London in *She Stoops to Conquer*, and in the following year she appeared in America with great success. After the death of her husband she again married, and in 1903 she returned to America, where she appeared in *The Crossways*, a play written by herself in collaboration with J. Hartley Manners.

Language, lan'gwaij. See PHILOLOGY.

Language, METHODS OF TEACHING. The practical end and aim of all language teaching is the securing of the accurate and fluent use of pure English. While, as far as securing accuracy of expression is concerned, lessons on all subjects should be considered language lessons, yet, for the purpose of securing the practical end for which language is used, this subject must receive special attention.

PRIMARY GRADES. While in these grades language and reading are inseparably connected, yet each needs specific treatment, and after the first few months the best results are obtained by having language lessons which are distinct from the reading lessons. Language lessons should be devoted to two lines of work, oral and written.

1. *Oral Language.* The object of this line of work is to secure accurate and fluent oral

expression. In order that this may be done, proper habits of speech must be formed, and bad habits must be broken up. The first task is much easier than the second. Since pupils in the primary grades will not express themselves freely under embarrassment, every effort should be made to make them at home in the school-room and to give them the greatest freedom possible in their language work. Again, in order that the best results may be obtained, the subjects used should be those with which the pupils are perfectly familiar. Having planned the recitation along these lines, the teacher should so conduct it as to secure the following results:

(a) Freedom of expression. Lead the pupils to talk freely about what they say and do at home and in school and upon the playground. This will remove any embarrassment that they may feel because of their new surroundings and enable them to become acquainted with one another and with the teacher.

(b) Hold conversation lessons with the pupils and in this way become acquainted with their vocabulary. Notice also their wrong habits of speech. This will give a key to the habits that must be broken up.

(c) Classify the errors in common use by the pupils. It will be found that these errors usually reduce to errors in the use of the verb, the pronoun and the preposition. When these errors are known, the teacher has a guide which she can follow in breaking up the bad habits of speech which the pupils have formed.

(d) Lead the pupils to correct their errors in speech. This is a somewhat delicate task and one which will need to be approached carefully. If corrections are made in such a manner as to cause the pupil to feel embarrassed, he ceases to express himself freely, and one of the important objects of the language lesson is lost. Usually corrections are best made by incidentally giving the correct form and asking the pupil to repeat it, then in succeeding lessons calling his attention to it again and again, until its use becomes a habit.

2. *Written Language.* Written work in the first year consists in copying words and sentences from the reading lesson, and during the first half of this year but little stress is placed upon this phase of the work. However, the teacher should see that whatever is attempted is performed accurately. Pupils should be trained from the first to use correct forms. Capitals and the period should be used in the

first sentence that the child writes. He should be led to consider these a part of the sentence. Since these forms are learned from imitation, the teacher should place before the children only such forms as they can copy correctly. During the last months of the first year, very brief written exercises may be required of the more advanced pupils of the primary grade. These should be based upon the nature study work and stories which the teacher has read or told to the pupils. The subject upon which the pupils are to write should be thoroughly reviewed a short time before the lesson is given.

All through the work in primary grades memory gems should be taught, beginning with those which the youngest children can easily understand and enjoy, and increasing in length and difficulty as the pupils' ability to understand them develops. Great assistance is rendered the pupils also by reading suitable selections and interesting stories, provided the teacher is a fluent reader, uses a pleasant tone of voice and clear enunciation. Since pupils are imitators, the teacher should be exceedingly careful in her use of language, as they will copy any inaccuracies which she may place before them. In the second and third grades much more written work can be done, but too much should not be attempted. The tendency often is to require so much that the pupils do not have time to do the work well, and the teacher is unable to examine it properly. This leads to the habit of carelessness, which, when once formed, is very difficult to eradicate.

INTERMEDIATE AND GRAMMAR GRADES. The purposes of the language work in these grades are to enable the pupils to express themselves with ease and accuracy, either in speaking or writing; to make them acquainted with the fundamental principles and rules of English grammar and their application. The same fundamental principles given for work in the primary grades should be followed in these grades, but the work should be more extended.

1. *Written Work.* This should be along two lines, drill work and original composition. Drill work should be given for the purpose of securing accuracy in form and original composition. Exercises in spelling, copying portions of the reading lesson, stanzas of poetry and exercises in using the different forms of irregular verbs are good illustrations of what exercises for drill purposes should be. If time is short and a course of study in which the work is definitely laid out is not at hand, it is well for

the teacher to classify these drill exercises, such as drills on the use of capitals, drills on the use of the comma, drills on the use of the forms of verbs. In this way definite work will be done, and all of the points upon which drill is necessary will receive attention. The value of this work is in its accuracy. Unless accuracy is insisted upon, these exercises contribute to the habit of carelessness and often do more harm than good.

Original composition should be carried on, along with the drill work. An important line of this work is letter writing. Pupils should begin this exercise in the third grade by writing simple notes, and they should continue it until they are able to write good letters, either of business or friendship. Many devices can be used to retain the interest, such as having pupils correspond with one another or having those in one school write to those in another. The letters may be read before the school. The ingenious teacher will discover many ways in which the work can be made interesting.

Another important line of work in these grades is the reproduction of stories told or read. At first the reproductions should be very simple, consisting of the reproduction of the thought in a stanza of poetry or a short paragraph of prose. The work should be increased in length and difficulty as the pupils advance in ability, until in the higher grades it should include the reproduction of some of the selections from the best authors. A similar line of work, but on different topics, is that of descriptions of places or people. Abundance of material is obtained from history, geography and literature for written exercises of every sort. In all cases abstract themes should be avoided, for children are not able to discuss them. The study of occupations and industries, including railroads and means of transportation, also furnishes many themes suitable for written language at these grades.

2. *Oral Language.* The purpose of oral language in these grades is to secure fluency of expression, correctness in speech and continuity of thought. The only difference between the work here and in the primary grades is in extending it to greater length and to more difficult topics. Oral reproductions of selections read, reciting such subjects as history and geography by topic, and the arrangement of reviews so that the different pupils in the class will recite fully upon different topics, afford excellent means for giving pupils drill in fluency of expression and continuity of thought. Such

exercises are particularly valuable, since they train the pupil to become a good conversationalist and to maintain his position with others after he leaves school. Oral reviews of books, articles in magazines and occasional debates among the older classes also tend to assist in securing the same end. See color plate, DRAWING.

The terms and principles of grammar should be introduced incidentally, beginning with the fourth grade. Early in this year subject and predicate are easily taught. After the terms have been introduced the teacher should call attention to them frequently, until the pupils are able to recognize the subject and predicate in all short sentences. In a similar way, the names of the parts of speech should be taught, beginning with the noun and following with verb, pronoun, adjective and adverb. When these are learned and understood, the parts of speech expressing relation, such as the preposition and the conjunction, can be learned, though probably these will not be reached before the fifth grade. In the higher grades in the grammar schools and with the oldest pupils in the ungraded schools, the principles and rules of grammar should be emphasized. This does not mean that a text-book in grammar should be formally studied, but that these fundamental principles, such as the agreement of a subject with its predicate in number and person, the different forms of the common irregular verbs in the present, past and perfect tenses, and the agreement of pronouns with their antecedents, should receive enough attention to enable the pupils to become familiar with the application of these principles and to use them correctly. Teachers in primary language will find valuable assistance in Mrs. Cooley's *Language Lessons from Literature*, Book I; Metcalf and Bright's *Language Exercises*, and Mrs. Rankin's *Everyday English*, Book I; while Southworth and Goddard's *Elements of Composition and Grammar* is valuable for teachers of intermediate and grammar grades.

Lanier, *la neer'*, SIDNEY (1842-1881), an American poet and musician, born at Macon, Ga. After graduating from Oglethorpe College, he taught one year and then entered the Confederate army. He served through the war, suffering so much from exposure and imprisonment that he was an invalid the rest of his life. After the war he supported himself for a time by teaching, serving as clerk in a shop and practicing law with his father in Macon;

but he devoted all of his spare time to music and literature. After 1873 he decided to give up all of his time to these arts, and in Baltimore and New York his musical ability was generally recognized. That his poetic ability was also admitted is shown by the fact that in 1876 he was chosen to write a cantata for the Centennial Exposition. In 1879 he was made lecturer on English literature at Johns Hopkins University, where he delivered the lectures afterward published as *The Science of English Verse* and *The English Novel*. He made frequent trips south in search of health, and on one of these journeys he died. Lanier's first published work was a novel, *Tiger Lilies*, which appeared in 1867 but met with little success. His poems, for which he is chiefly famous, are remarkable for their exquisite melody. He was one of the genuine poets of his generation, and his fame is growing steadily. Among his best-known poems are *Corn*, *The Marshes of Glynn* and the *Song of the Chattahoochee*.

Lan'kester, EDWIN RAY (1847-), an English scientist, noted for his remarkable studies in biology and as the director of the department of natural history in the British Museum. Besides a number of technical publications on different animal forms, he has published *Comparative Longevity*, *Regeneration* and several volumes of scientific articles.

Lan'sing, MICH., the capital of the state and the county-seat of Ingham co., 90 mi. n. w. of Detroit, at the junction of the Grand and Cedar rivers, on the Grand Trunk, the Michigan Central and several other railroads. The city occupies a level site and has broad and well-shaded streets. It was settled in 1837 and was laid out as the capital ten years later, when the place was still a comparative wilderness. The state capitol is a fine structure located in a twelve acre park near the center of the city. The state school for the blind and the state industrial school for boys are located here, and the state agricultural college, with its farm of 675 acres, is near the city. Other important structures are the city hall, the high school, the public library, a hospital and the Federal building. The Grand River has a fall of eighteen feet and furnishes good water power. The manufactures include flour, stoves, automobiles, agricultural implements, artificial stone, machinery, condensed milk, beet sugar and knit goods. The city has about twenty churches and an excellent public school system. Population in 1904, 20,276.

Lantern Fish

Lantern Fish, a name applied to a number of different deep sea fishes, some of which are of remarkably grotesque appearance. They are called lantern fish because they possess organs which give the light necessary for them to see by in the great depths at which they live.

Lantern Flies, insects allied to the cicadas, but forming a family by themselves. The lantern fly proper is a native of South America. It is more than three inches in length and five inches across the wings. It is reported to fly only during sunlight and not to appear abroad during dark. The name is probably given these insects solely on account of the shape of their heads.

Laocoön, *la ok'o on*, in ancient Greek legend, a Trojan priest of Neptune. Near the close of the Trojan War, when the Greeks tried to introduce into Troy the wooden horse, Laocoön protested strongly and perhaps might have convinced his countrymen of his wisdom had not a serious accident occurred. Two enormous serpents glided up from the sea and, winding themselves about Laocoön and his two sons, crushed them to death. This was regarded by the Trojans as a sign that Laocoön had been guilty of sacrilege in doubting the sacred character of the wooden horse. This story serves as the subject of various sculptures, chief among them a group discovered in 1506 and now in the Vatican. See WOODEN HORSE.

La'odami'a. See PROTESILAUS.

Laodicea, *la'od ee see'ah*, the ancient name of several cities in Asia Minor. One of these, which is now called Eski-hissar, was the site of one of the seven primitive Christian churches of Asia. Another is now known as Sorgan Ladik.

La Paz, *lah pahs'*, a town of Bolivia, capital of a department of the same name. It is more than 12,000 feet above sea level. The city is built in amphitheater form, is the seat of a bishopric and has a cathedral and a university. It is a place of considerable wealth and importance. Most of the inhabitants are Aymara Indians or are of mixed race. Population, 45,000.

Lapidary, one who cuts and polishes precious stones. The success of the art depends almost entirely upon the skill of the workman. The gem to be cut is fastened to a holder, which is about the length of a lead pencil, and then pressed against a revolving wheel whose surface is covered with diamond dust. The gem is held in place by a device attached to the

Lapland

frame that supports the wheel, so that flat surfaces and sharp angles are obtained. See DIAMOND; PRECIOUS STONES.

La'pis Laz'uli or **Lazurite**, a mineral composed of silica, aluminum, iron and several less important substances. It occurs in crystals and in massive form. It is found in granite and crystalline limestone. The best qualities are obtained from China, Siberia, Persia and Chile. This stone was prized by the ancients for its supposed medicinal properties and was used by the Egyptians for jewelry. Fine specimens were also used for vases, inlaid work and mosaics. When ground into powder and mixed with oil, it makes ultramarine, but the supply of this color is now obtained by an artificial process. See PRECIOUS STONES; ULTRAMARINE.

Laplace, *lah plas'*, PIERRE SIMON, Marquis de (1749-1827), the greatest of French astronomers. His parents were very poor and unable to give him an education, but through the assistance of influential friends he was enabled to go to school, and at the age of twenty he became professor of mathematics in the military school, through the influence of D'Alembert, who was his patron. He is especially known by his important work in regard to improvements of the lunar theory, the question of tides and the stability of the solar system. His greatest work was a complete solution of the problem of the solar system, one of the most important contributions to science (See NEBULAR HYPOTHESIS). In physics, also, he made many important experiments.

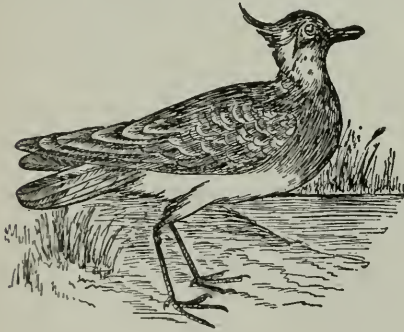
Lap'land, the land of the Lapps, an extensive territory in the north of Europe, between 85,000 and 90,000 square miles in area. Of this territory more than half belongs to Russia, and the remainder is shared, in nearly equal proportions, between Sweden and Norway. The climate for nine months is excessively cold; spring and autumn are short, and the summer of two months is extremely hot. Vegetation is scanty, except in the form of birch, pine, fir and the mosses which supply food for the herds of reindeer. The Laplanders are a small, muscular, large-headed race, with high cheek bones, wide mouth, flat nose and scanty beard. Many of them are nomadic, owing their subsistence to their herds of reindeer; others support themselves by fishing. They are generally ignorant, simple-hearted and hospitable. The Norwegian Laplanders belong to the Lutheran, and the Russian Laplanders belong to the Greek Church. Their numbers do not exceed 30,000.

La Plata, *la plah'tah*, a city of the Argentine Republic, 32 mi. s. e. of the city of Buenos Ayres, with which it is connected by rail. Founded in 1882 as the capital of the State of Buenos Ayres, it has already become an important city, having a palace for the legislative assembly, a cathedral, law courts, a theater, a public park and a system of public and private schools. Population in 1901, 75,000.

La Plata, RIO DE. See PLATA, RIO DE LA.

La Porte, *la port'*, IND., the county-seat of La Porte co., 12 mi. from Lake Michigan and 59 mi. s. e. of Chicago, on the Lake Erie & Western, the Lake Shore & Michigan Southern and other railroads. The city is in a farming region, and its manufactures include woolen goods, agricultural implements, wheels and other articles. There are beautiful lakes in the vicinity, and the place has become an attractive and popular summer resort. It was settled in 1830 and was chartered as a city in 1852. Population in 1900, 7113.

Lapwing, a handsome bird, belonging to the plover family. The common lapwing is a well-known bird about the size of a pigeon and is often called the peewit, from its peculiar cry.



LAPWING

This is a European bird, whose eggs are esteemed a great luxury and are gathered and sent to the markets. Its back is glossy green; head and neck and delicate crest, black; breast and under parts, white. Other species are found in Asia and South America.

Laramie, *lar'a me*, WYO., the county-seat of Albany co., 56 mi. n. e. of Cheyenne, on the Big Laramie River and on the Union Pacific railroad. It is a thriving city, located on an elevation of over 7000 feet, in the neighborhood of rich deposits of coal, iron, lead and other minerals. The city has extensive railroad shops, rolling mills, soda works, flour mills and glass works. Laramie is the seat of the state univer-

sity, the state agricultural college, a United States Agricultural Experiment Station and the state fish hatchery, and is the see of the Protestant Episcopal bishopric of Wyoming. The railroad company started the first sale of lots in April, 1868, and in less than two weeks many buildings had been constructed and the rapid growth of the city had begun. Population in 1905, 7601.

Laramie Mountains, a range of the Rocky Mountains which extends through southeastern Wyoming and into Colorado. The highest point is Laramie Peak, 10,000 feet high. Coal is found in abundance.

Larceny, *lahr'se ny*, the fraudulent appropriation of the property of another person without that person's consent. To constitute this crime the removal of the goods to any distance is not necessary, but the article must completely pass, for however short a time, into possession of the criminal. The common law restricted the classes of things the appropriation of which is larceny, to personal property, but this distinction has been largely abolished by recent statutes. Larceny was formerly divided into two kinds, *grand* and *petty*, according to the value of the thing stolen, but the distinction is now abolished in almost all the states. The penalty varies, but in ordinary cases a person convicted of larceny is generally liable to imprisonment with hard labor for not more than two years; on second conviction not more than ten, nor less than four. See ROBBERY; BURGLARY.

Larch, the common name of a genus of trees belonging to the cone-bearing family, but not themselves fragrant. In New England and Canada the native species is known as *hackmatack*, and in the western and southern states the same tree is known as *tamarack*. This American larch often grows to a height of seventy feet in swampy places, where the soil is deep. It has a slender trunk and horizontal branches which are covered with fine, needle-like leaves that fall in autumn. The small cones turn to a beautiful deep red before they ripen. The wood, which is compact and durable, heavy and difficult to burn, is valued for fence posts, railroad ties, telegraph poles, and in shipbuilding.

Lar'com, LUCY (1826-1893), an American poet, born in Beverly, Mass. As a Lowell factory girl, she attracted the favorable attention of Whittier by her contributions to a little paper conducted by the operatives in the cotton mills. She was afterwards educated in the Monticello Female Seminary in Illinois and then taught school in Massachusetts. She was editor of

Lard

Our Young Folks, a Boston magazine, and published *Childhood Songs and Wild Roses of Cape Ann and Other Poems*. Her poems of New England life were especially effective, and *Hannah, Binding Shoes* became the best known.

Lard, the fat of the hog. Lard is obtained by extracting it from the fatty portions of the carcass, in kettles heated by steam. It is clarified by heating to a high temperature, straining and then cooling by refrigeration. Just before it solidifies, the lard is run into pails, barrels or other vessels for marketing. The best quality is found in the fat which surrounds the kidneys, and this is employed in pharmacy for the preparation of ointments. When subjected to pressure the oleine is liberated, forming lard oil, which is much used as a lubricant for machinery. Lard is used in cooking, in the manufacture of soap and for many other purposes.

Laredo, *la ray'do*, TEX., the county-seat of Webb co., 140 mi. s. w. of San Antonio, on the Rio Grande and on the International & Great Northern, the National of Mexico and other railroads. The city is in a fertile agricultural and stock-raising district of Texas and is an important shipping point between the United States and Mexico. Grape culture and the raising of vegetables are the most important industries. There are valuable coal mines in the vicinity, and the city contains car and machine shops, brick and tile works, tanneries, foundries and other factories. Laredo has a fine courthouse and jail, the Mexican National and Mercy hospitals, Ursuline Convent and is the seat of Laredo Seminary and Ursuline Academy. The place was settled by the Spaniards in 1767 and was first incorporated in 1848. Population in 1900, 13,429.

Lares, *lay'reez*, and **Penates**, *pe nay'teez*, the inferior Roman gods who presided over the home and over families. The Penates were regarded as having been gods from the beginning, while the Lares were human beings who had died and returned to watch over their friends or descendants. As far as the two classes of deities had separate provinces, it was believed that the Penates protected the interior of the home and watched over its happiness, while the Lares guarded it from danger from without. These deities were usually worshiped in the form of small images, which were held as the most sacred possessions of the household. When a family moved, it took with it its Lares and Penates and provided a place for them before the welfare of the family was looked after.

Larva

They were usually kept in the atrium (See ATRIUM).

Lark, a song bird related to the finches, having a strong, short bill, nostrils covered with feathers, forked tongue and the power to raise the feathers on the back part of its head into the form of a crest. Larks are found generally distributed over the old world, but the only species in America is the shore lark. The larks live upon the ground, feeding on worms and larvae, and bring forth two broods in a year. The best known is the *English skylark*, which is celebrated for the prolonged beauty of its song, which it utters as it rises high in the air in spiral flight. It usually sings early in the morning and only during the nesting season. No bird has been more celebrated by poets than this, and Shelley's *Ode to the Skylark* is one of the most beautiful poems in the English language. A few of these birds have been introduced into the United States, and some are now living wild on Long Island and elsewhere in the East.

Larkspur, the common name of a genus of plants belonging to the buttercup family. Some medicinal properties are possessed by several species, but they are cultivated principally for their handsome, irregular flowers, which grow in large open clusters or in spikes. One hundred or more species are found wild in the United States, but the most beautiful kinds are natives of Asia. Gardeners have produced beautiful double flowers with a great variety of coloring.

La Rochefoucauld, *lah rohsh foo ko'*, FRANÇOIS, Duc de, Prince de Marcillac (1613-1680), a distinguished French courtier and man of letters. As a military officer he appeared at the court of Louis XIII, but was suspected by Richelieu of favoring the party of Queene Anne of Austria and was exiled to Blois. After the death of Mazarin he became reconciled with the court and played a brilliant rôle there. His *Mémoires* and his *Maximes*, published anonymously in 1665, are his chief writings. The latter work, for its brilliancy of style, is still considered a French classic.

Larva, *lahr'va*, a name used to denote, in natural history, the first stage in the metamorphosis of insects and the early form of any animal, in which there is little resemblance to the parent. In the latter sense the tadpole is the larva of the frog. In insects this is the grub or caterpillar stage. When the insect first appears, it is usually in the form of a maggot, or small worm, as it is popularly, though wrongly, called. The larval stage is usually the active stage of

insect life, during which the animal accomplishes most of its growing. From time to time the larva sheds its skin to permit of greater growth. See METAMORPHOSIS; INSECTS; also CATERPILLAR.

Larynx, *lar'inks*, the organ of voice, situated between the hyoid bone and the upper part of the trachea, communicating with the pharynx above and the trachea below. It is composed of nine cartilages, one *thyroid*, one *cricoid*, one *epiglottis*, two *arytenoid*, two *cornicular laryngis* two *cuneiform*. The cricoid cartilage has the shape of a signet ring, with the broad part toward the back of the throat, and is attached by fibrous tissue to the upper part of the trachea. The two arytenoid cartilages are placed on top of the wide part of the cricoid, with which they articulate in a movable joint. The vocal membranes are attached to them. The two halves of the largest cartilage, the thyroid, meet in an angle in front, but its sides do not form a complete ring. The projection of this cartilage is known as *Adam's apple*. The epiglottis is attached to the top of the thyroid in such a manner that it may close the opening from the pharynx to the larynx during the act of swallowing. The vocal cords are two membranes which extend from the arytenoid cartilages across the larynx to the thyroid. They may be compared to the head of a drum, the membrane of which has been slit across the middle. The length and tension of these membranes are controlled by the movements of the arytenoid cartilages. In quiet breathing the slit, called the glottis, is wide open, being narrow in front and wider behind. A set of muscles pulls the arytenoid cartilages backward, thus stretching the vocal cords; another set pulls the same cartilages toward the thyroid cartilage, making the vocal cords slack; a third set pulls the arytenoids toward each other, making the glottis narrower behind, while a fourth set has an opposite effect. The space above the vocal cords is triangular in shape, and its mucous lining, just above them, makes on each side a fold known as the false vocal cords. The ventricle of the larynx lies between the true and the false cords. See VOICE.

La Salle, *la sal'*, ILL., a city in La Salle co., 99 mi. s. w. of Chicago, on the Illinois & Michigan Canal and on the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and the Illinois Central railroads. It lies on high bluffs along the Illinois River, near productive bituminous coal fields, and has a large trade. The other important industries are zinc smelting

and the manufacture of cement, brick, sulphuric acid, implements, clocks and glass. The city has a public library, a township high school and several hospitals, and is the seat of Saint Bede College. The place was settled in 1830 and was named in honor of La Salle, the explorer. Population in 1900, 10,446.

La Salle, RENÉ-ROBERT CAVELIER, Sieur de (1643-1687), a French explorer in America. He went to Canada early in 1666, and from there he conducted many expeditions. In 1669 he descended the Ohio to the site of Louisville and later explored the regions of the Great Lakes.



LA SALLE

Finally he set out to explore the Mississippi and was the first to follow the river to its mouth. He established Fort Saint Louis, on the Illinois River, and, returning to France, was made commandant of all the country which he had found. On another voyage he tried to find the mouth of the Mississippi, but failed; his party was scattered, and he was shot from ambush by a mutinous soldier.

Las Casas, *las kah'sas*, BARTOLOMÉ DE (1474-1556), a Spanish prelate, known as the "Apostle of the Indies." He went to Hispaniola in 1502 and on the conquest of Cuba received charge as priest there and distinguished himself for his humane treatment of the natives. In the cause of religion he visited various parts of the New World, including Mexico, Guatemala and Peru. In 1542 he wrote his famous *Breuissima relacion*

Lassa

de la destruycion de las Indias. He was made bishop of Chiapas in 1544, but three years later returned to Spain.

Lassa, *lahs'sah*. See **LHASA**.

Lassalle, *la sal'*, FERDINAND (1825-1864), a German socialist, educated at Berlin University. He first made himself known as a leader during the democratic troubles of 1848 and was imprisoned for a year. In 1861 he published his *System of Acquired Rights*. Thereafter he organized the working classes, which caused the government to accuse him of sedition, and he was imprisoned for four months. In May, 1863, he founded a labor union and began that socialist propaganda which has since become so widespread in Germany.

Las'so, a contrivance used in Spanish America and in the Western states of the Union, consisting of a long rope of plaited rawhide, at one end of which is a small metal ring. By means of this ring a noose is readily formed, and the lasso, or *lariat*, is then used for catching wild animals, the rope being cast over the animal's head or leg while the hunter is in full gallop. Most remarkable skill is acquired by those who use the lasso, which is the constant companion of the "cowboy" on the great cattle ranges of the West.

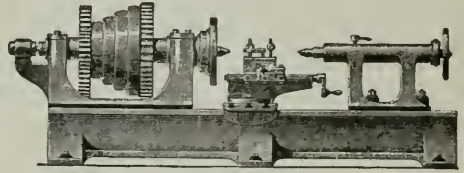
Las Vegas, *las va'gas*, N. M., the county-seat of San Miguel co., 40 mi. directly e. of Santa Fé, on a branch of the Pecos River and on the Atchison, Topeka and Santa Fé railroad. The city is composed of two parts, the old Mexican settlement and the modern city, known as East Las Vegas until it was incorporated as the city of Las Vegas in 1896. The city is located just between the Rocky Mountains and the plains. It has a large trade in wool and contains wool scouring works, flour mills, wagon shops, foundries, breweries and other factories. There are about 40 of these springs and on account of their curative properties, they have become a favorite resort for invalids. The city contains the New Mexican Normal University, a public library, the Castaneda Hotel and many fine buildings. The famous Las Vegas hot springs are six miles from the city. The population of the incorporated city in 1900 was 3553, but that of the whole city is estimated at 8000.

Lat'eran, one of the churches at Rome, built originally by Constantine the Great and dedicated to Saint John of Lateran. The site on which the buildings stand originally belonged to Plautius Lateranus, who was put to death by Nero. The Lateran is the episcopal church of

Lathrop

the pope and the principal church of Rome. It has a palace, now used as a museum of statues and antiquities, and other buildings annexed to it. Every newly-elected pope takes solemn possession of the church, and from its balcony he bestows his blessing on the people. The palace and the church belong absolutely to the popes, having been given them by the Italian government in 1871. Pope Leo XIII and many of his predecessors are buried in the Lateran.

Lathe, *layth*, a machine for turning and polishing flat, round, cylindrical and oval objects



LATHE

of wood, ivory or metal. The object worked receives a rotary motion. The important parts of the lathe are the frame, the balance wheel, the two heads, to which the object to be turned is fastened, and the rest for the chisel. One head slides in the groove in the frame and can be firmly fastened at any point by a screw. This admits of turning articles of different lengths. A belt passes from the balance pulley over another in the head and imparts the motion. A series of pulleys of different sizes on the balance wheel and head enable different rates of speed to be maintained. A lathe for turning wood has a much higher speed than one for turning metal. The tools used are chisels made especially for the purpose. Small lathes are often run by foot power, but large ones use steam or electric power.

La'throp, GEORGE PARSONS (1851-1898), an American poet and journalist, born in the Sandwich Islands. He was educated in New York and Dresden, Germany; studied law for a time, was an editor of the *Atlantic Monthly*, and later, of the *Boston Courier*. In England (1871) he married Nathaniel Hawthorne's daughter Rose, who was herself a writer of prose and poetry. He lived in Hawthorne's old home, The Wayside, at Concord, Mass., and afterwards in New York. He founded the American Copyright League (1883). Part of his writing was done jointly with his wife. It includes works on Nathaniel Hawthorne; many poems, as *Dreams and Days*; a novel, entitled *Afterglow*, and *A Story of Courage*.

Lathrop, ROSE HAWTHORNE. See **LATHROP**, GEORGE PARSONS.

Latimer, HUGH (1490-1555), an English prelate, reformer and martyr. He was educated in Cambridge, was made chaplain to Henry VIII in 1530 and during the ascendancy of Anne Boleyn in 1535 he was appointed bishop of Worcester. In 1539 he resigned his bishopric, not being able to accept the Six Articles, and lived in privacy for six years. On coming to London, he was put in prison, but on the accession of Edward VI was released and became highly popular at court. This continued until Mary ascended the throne, when Latimer was cited to appear, along with Cranmer and Ridley, before a council at Oxford. He was condemned, and after much delay and a second trial, Latimer and Ridley were burned at the stake, Oct. 16, 1555.

La'tin Language. Latin is a branch of the Indo-European, or Aryan, family of languages. It was spoken by the people of central Italy perhaps as early as 1500 B.C. In the period of the Roman Republic and the Empire it received its literary form, and it is to the language of that time the designation *classical* is given. During the last two centuries of the Empire, Latin became much corrupted through contact with other languages, and this process was still more marked after the fall of Rome. By the eighth century it had ceased to be a generally spoken tongue, and in the several countries where Roman civilization had been established, it had developed into the several tongues which have survived in the modern Romance languages. The chief representatives, besides Italian, are French, Spanish, Portuguese and Rumanian. In Great Britain the effect upon the language of the first contact with Latin was not considerable, owing to the early extinction of Roman supremacy there and the overpowering inroads of Germanic tongues. Of the large proportion (about three-sevenths) of words of Latin origin in the English language, the most came in through the Norman Conquest (See **ENGLISH LANGUAGE**).

It is to be noticed that the Romance tongues are descended, not from classical Latin, but from what is known as folk-Latin, the corrupted idiom of later popular speech. During the Dark Ages, Latin continued, in a corrupted form, to be the language of the Church, law and learning, and in some countries it remained so until within two centuries. In still later times it was employed, restored to its classical form, in

learned writings and as a means of international communication. It was the clergy who preserved the Latin language and literature in the Dark Ages, and to the convents were carried the remnants of the libraries.

In structure and vocabulary Latin is more closely related to Greek than to any other Indo-European language, an interesting evidence of the probably close relationship of the two races. The Latin language is remarkable for its accuracy of expression and its perfect mechanical structure. It was, indeed, well fitted for its important service in the law. As Latin has never ceased to be spoken as a learned language, its pronunciation has followed in general the principles governing the language of each country in which it is used. In America a method known as the *Roman* is, however, now almost universal in the universities, colleges and high schools of the country. This is an attempt to attain to the real pronunciation of Latin in the time of Cicero. The vowels are pronounced almost as in Italian, French and Spanish, and the consonants have their English sounds, with the exception that *c* and *g* are always hard; *r* is trilled; *s* is voiceless; *z* is like *dz*; *ph*, *th* and *ch* are really aspirated consonants. In England the so-called *English method* is still used in the schools, the Latin words being pronounced precisely as if they were English.

Lat'itude, in geography, the distance of any place on the globe north or south of the equator, measured on its meridian. It is called *north* or *south*, according as the place is north or south of the equator. The highest or greatest latitude is 90°, that is, at the poles; the lowest or smallest, 0°, at the equator, between which and the poles any number of parallel circles called *parallels of latitude* may be supposed to be drawn. One method of finding the latitude of a place is by measuring the altitude of the polar star, the latitude of the observer being equal to the altitude in degrees of the star above the horizon. When the latitude and longitude of a place are given, its position on a map is easily found (See **LONGITUDE**). Certain parallels of latitude are more noteworthy than others. See **ANTARCTIC CIRCLE**; **ARCTIC CIRCLE**; **EQUATOR**; **TROPICS**.

Latium, *la'she um*, the ancient name applied to a district of central Italy, on the Tyrrhenian Sea, extending between Etruria and Campania and inhabited by Latins, Volsci, Aequi and other peoples.

Latour D'Auvergne, *la toor' do vair'ny'*, THEOPHILE MALO CARRET DE (1743-1800), a French soldier. Entering the military service in 1767, he became aid-de-camp to the duke of Crillon and distinguished himself at the siege of Port Mahon. When the revolution began he was a captain of grenadiers and as, in spite of his meritorious services, he refused higher positions, he was named *First Grenadier of France* by Napoleon. He commanded a corps of eight thousand men, which was known as the *infernal column*. In 1799 he fought under Massena in Switzerland and fell at Neuburg, June 27, 1800.

Lat'terday Saints. See MORMONS.

Laud, WILLIAM (1573-1645), archbishop of Canterbury in the reign of Charles I, born at Reading in Berkshire. He was educated at Saint John's College, and took priest's orders in 1601. He became unpopular with the university authorities because he was so opposed to Puritanism. He filled many positions, was made archbishop of Canterbury in 1633 and was twice offered the cardinal's hat. As archbishop he instituted rigorous proceedings against all who would not conform to the Church of England. By means of spies he hunted out the Puritans, and he sought to extinguish all forms of dissent through fines, imprisonment and exile. When the Long Parliament met (1640), the archbishop was impeached for high treason. The House of Commons passed a bill of attainder (1644) and declared him guilty of high treason. He was beheaded on Tower Hill.

Lau'danum or **Tincture of O'pium**, a brownish-red fluid, prepared from opium and having the qualities of that drug, but in a milder degree. It is a frequent ingredient of "soothing syrups" for infants and is sometimes given to relieve colic and pains. Its use, however, is liable to be very injurious, and not a few deaths among infants follow very small doses. See OPIUM.

Laughing, *lah'fing*, **Gas**, nitrous oxide or nitrogen monoxide or protoxide of nitrogen; so called because, when inhaled, it usually produces exhilaration. It is administered by dentists to deaden pain and produce unconsciousness during the extraction of teeth, as its effects are usually less severe than those of ether or chloroform. See NITROGEN.

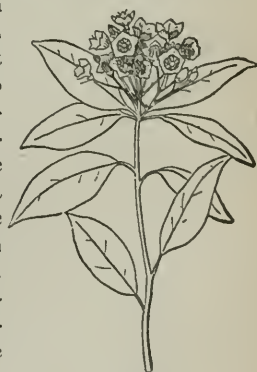
Laughlin, *lah'lin*, JAMES LAURENCE (1850-), an American economist and educator, born at Deerfield, Ohio. He graduated at Harvard in 1873, taught in the public schools of

Boston and later as instructor and assistant professor in political economy at Harvard. In 1887 he became president of the Manufacturers' Mutual Insurance Company, Philadelphia, and retained the position until 1890, when he became full professor of political economy at Cornell University. Two years later he accepted a similar position at the University of Chicago. As a member of the monetary commission, he took an active part in its discussions and wrote a report of the greatest value. Among his published writings are *The History of Bimetallism in the United States*, *Elements of Political Economy* and *Facts About Money*.

Laureate, *law're ate*, POET, a name first applied to poets who were honored by the gift of a laurel wreath. It is now the title of an official of the royal household of Great Britain, the patent for which appears to have been granted by Charles I in 1630, although Ben Jonson and others are said to have held the title previously. Since the reign of George III, there have been no special duties connected with the office. From the time of Charles II the following poets have in succession held the office of laureate: John Dryden, Thomas Shadwell, Nahum Tate, Nicholas Rowe, Lawrence Eusden, Colley Cibber, William Whitehead, Thomas Warton, Henry James Pye, Robert Southey, William Wordsworth, Alfred (Lord) Tennyson and Alfred Austin. The salary is \$360 a year.

Lau'rel. The sweet bay, or laurel, is a native of the north of Africa and south of Europe and is cultivated in gardens, not only on account of its elegant appearance, but also for the aromatic fragrance of its evergreen leaves. The fruit, which is of a purple color, and the leaves, have long been used in medicine. The common, or cherry, laurel, the Portugal laurel and the spurge laurel are very different from the true laurel.

The name is also given to other plants, as in America to species of rhododendron and other plants having thick leaves of a dark, glossy green. In ancient times heroes and scholars were crowned with wreaths of bay leaves, and thus the terms *laurels*, *bays* and *laureate* came to



LAUREL

be significant of honor. From the fruit of the sweet bay, or laurel, several oily substances have been extracted; the cherry laurel yields a volatile, poisonous oil when its leaves are distilled in water.

Lau'rens, HENRY (1724-1792), an American soldier and patriot, born in Charleston, S. C., of Huguenot descent. He entered business at Charleston, but retired in 1771 and spent several years in European travel. He believed in the validity of the Stamp Act and opposed forcible opposition to the intolerable acts of 1774, but he nevertheless became active in the struggle against Great Britain, was elected to the second Continental Congress and presided over it after Nov. 1, 1777. He resigned in the following year, and in 1779 he was sent to Holland to frame a commercial treaty. He was captured by the British and imprisoned in London Tower for more than fifteen months. After his release he became one of the American peace commissioners and signed the Treaty of Paris in 1783.

Laurens, JOHN (1753-1782), an American soldier, son of Henry Laurens, born in South Carolina and educated in England. He became an aide to Washington in the Continental Army in 1777, participated in almost all of Washington's great battles and was several times wounded. In 1781 he was sent to France, where he succeeded in negotiating a loan in spite of his independence of diplomatic forms. Returning to America, he fought at Yorktown and in the following year was killed in one of the minor skirmishes of the Southern armies. He has been called the "Bayard of the Revolution," on account of his patriotism, gallantry and uniform courtesy and kindness.

Laurentian, *law ren't'shan*, **Mountains**, a range of highlands or mountains in Canada, extending for over 3000 miles from Labrador to the Arctic Ocean, forming the watershed between Hudson Bay, the Saint Lawrence and the Great Lakes, and dividing Hudson Bay from the sources of the Mackenzie River. The average elevation is about 1500 feet, while some of the peaks attain a height of over 3000 feet.

Laurier, *lo re ay'*, WILFRID, Sir (1841-), a Canadian statesman, born at Saint Lin, Quebec. He was educated at L'Assomption College and McGill University and was admitted to the bar in 1864. For a short time he was editor of *La Deffricheur*, then became member of the Quebec Assembly. In 1874 he was elected to the Dominion Parliament and became minister of internal revenue in 1877. Upon the retirement

of Mr. Blake, Laurier became leader of the Liberal party, and in 1896 he was chosen premier of the Dominion, being the first French-Canadian to hold the office. In 1898 he was



SIR WILFRID LAURIER

appointed a member of the Anglo-American Joint High Commission. His eloquence and magnetism earned for him the sobriquet of "silver-tongued Laurier."

Lau'rium, MICH., a village in Houghton co., 17 mi. n. e. of Houghton, on the Mineral Range and the Copper Range railroads. Laurium is on the Keweenaw peninsula and in the midst of one of the richest copper regions in the United States and in the world. The chief occupation is the mining of copper, and the industries directly connected with this are of considerable importance. There are also mattress, clothing and cigar factories. Laurium and Red Jacket, which is also an important mining center, are situated in the township of Calumet. Formerly the name Calumet was applied to the villages and townships alike, but in 1895 the name Laurium was given the chief village. Population of the village in 1904, 7653; of Calumet township, 28,587.

Lausanne, *lo zahn'*, a town in Switzerland, capital of the canton of Vaud, on the slopes of Mont Jorat, about $\frac{1}{2}$ mi. from the Lake of Geneva. Lausanne is built on three hills, two of which are connected by a lofty viaduct, and the most interesting building is the Gothic cathed-

dral, erected in the thirteenth century. Lausanne is of little trade or commercial interest, but it is much visited by tourists, and its educational institutions attract many foreign pupils. In 1875 it became the seat of the supreme court of the Republic. Population in 1900, 47,444.

Lava, *lah'va*, the general name for all rocky matter which flows or has flowed in a molten state from volcanoes and which, when cooled, forms varieties of tufa, trachyte and basalt, according to the proportions of feldspar, hornblende and augite which enter into its composition. The texture of rocks formed from lava depends upon the rapidity with which the mass has cooled. When cooled rapidly the lava forms a compact rock. If cooled slowly, the rock is porous and often brittle and easily crumbled. Lava beds occur in two forms, those which have been deposited by the overflow of volcanoes, and are found on the sides and at the base of the mountains, and those which have been forced up between other layers of rock and have cooled in this position. Such beds often outcrop at the summits of mountains or at high altitudes upon their sides. See VOLCANO.

Laval', a town of France, capital of the Department of Mayenne, 45 mi. e. of Rennes. It is an interesting and picturesquely situated place, and among its principal edifices are the cathedral, the episcopal palace and an ancient castle, now a prison. The manufactures consist of damasks and other linen goods, flannels, leather, machinery and marble products. Population in 1901, 25,326.

Laval-Montmorency, *la val'mohN mo rahN-see'*, FRANÇOIS XAVIER DE (1622-1708), a French churchman, born at Laval. He became a priest at twenty-three and a few years later became archdeacon of Evreux. In 1659 he was sent to Canada, as a special envoy of the pope, and established the Seminary of Quebec, besides actively engaging in the upbuilding of French and Catholic influence in the region. Laval University, Quebec, was named in his honor.

Laval University, a French educational institution, established at Quebec in 1852, under the auspices of the Roman Catholic Church. It maintains departments of theology, law, medicine and arts. The faculty numbers over fifty, and there are about 400 students. The library contains 140,000 volumes, and the museum has one of the most complete collections of indian relics in America.

Lavender, a fragrant shrub, three or four feet high, which is a native of the south of Europe.

From the flowers of the lavender is extracted an oil which is much in demand as a perfume. The oil is pale yellow, with an aromatic odor and a hot taste, and it is used as a stimulating medicine. Lavender water is a solution of oil of lavender, flavored with attar of roses, bergamot, musk, cloves or other preparation. Florida water, a favorite American perfume, is largely prepared from lavender.

Laveran, *la v'rahN'*, CHARLES LOUIS ALPHONSE (1845-), a French physician, noted for his investigations into the cause and treatment of malarial fever. In carrying out his plans, he resided for five years in Algeria and then returned to France. He discovered the plasmodium which is the cause of malaria and thus, with Patrick Manson, opened the way to the intelligent treatment of that disease.

Lavoisier, *la vva'h syay'*, ANTOINE LAURENT (1743-1794), a celebrated French chemist. His first public distinction was to receive the prize for the best essay on lighting the streets of Paris. He was the first to organize the methods of chemistry and establish its terminology. Accused before the Convention as an ex-farmer-general, he was guillotined in the Reign of Terror.

Law, in government, a rule of conduct prescribed by a competent authority; the body of all such rules, and the science which investigates and treats of them. Law in the first and second meanings given above originated in custom, in the precedents of the action or forbearance from action of individuals, kinsmen, tribes and, finally, of the community as a whole, or society. Eventually, the necessity of establishing tribunals for settling controversies became apparent, and the decisions of these tribunals gave to precedent a much greater force and eventually practically established laws by declaring what previous custom had been. Gradually these tribunals or courts evolved a new set of rules, not founded entirely upon precedent, but upon common sense and conscience. Here was the origin of the law of equity. It was not a long step from law making by judges to the establishment of a special law-making body, or legislature. Thus, the three great branches of law were developed, *common law*, or the law of custom; *equity*, or the law of right, and *statutory law*.

Law in its modern sense is said to be of two kinds, *substantive*, which deals with principles of right to be followed, and *adjective*, or *remedial*, which deals with procedure in case of violations, that is, with the arrest and trial of offenders. Substantive law is in turn divided into *public*

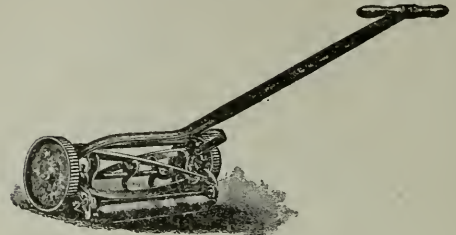
law, which deals with the state and its relations, and *private law*, which concerns private persons and property. Another division of public law is sometimes made. It is said to consist of *international law*, or the law recognized between nations, *constitutional law*, which regulates the organization and the relations of the parts of a single state, and *administrative law*, which regulates the procedure of the various organs of government. Adjective or remedial law has to do not only with civil and criminal procedure, but with the classification of crimes and penalties. This article treats only of the fundamental principles and the general organization of the subject of law. The many variations in the treatment and framing of laws by different nations and races cannot be profitably discussed in this work. General statements of the important points of difference will be found in the articles upon the most important nations. See, also, CIVIL LAW; COMMON LAW; EQUITY; STATUTE; INTERNATIONAL LAW; PROCEDURE; COURTS; CRIME.

Law, JOHN (1671–1729), a celebrated financier and speculator, son of a goldsmith of Edinburgh. In 1691 he went to England, where he soon showed great financial ability, but in 1695 he was obliged to leave the country on account of a duel. Returning to Scotland in 1700, he made proposals to the Scottish Parliament to remedy financial affairs in Scotland by the issue of paper currency to the value of all the land of the kingdom. This proposition, which the Scottish Parliament rejected, he also advanced in various Continental countries, where it was again rejected. Having made a fortune by gambling, he went to Paris and there set up a bank. The duke of Orleans became his patron and changed the bank to a national bank. In 1717 Law floated the celebrated Mississippi Scheme, and his influence and power in the country increased greatly. The large amount of paper currency issued made the shares, however, soon depreciate in value, and in 1720 the Mississippi Scheme, with the bank, collapsed, and Law was obliged to flee from France. See MISSISSIPPI SCHEME.

Lawn Mower, a machine used for cutting grass on lawns. It consists of a set of spiral knives with blunt edges, so arranged that when the machine is pushed along they revolve rapidly and cut the grass by bringing it against a stationary knife. They do not work successfully in long grass.

Lawn Tennis, a modified form of an old English game, played with rackets and light

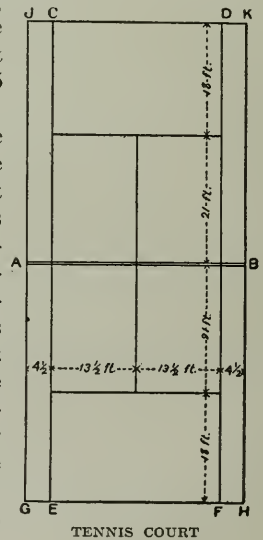
rubber balls about $2\frac{1}{2}$ inches in diameter and thinly covered with felt. The ground, or *court*, on which tennis is played should be 78 feet long by 27 feet wide when two play, or 36 feet wide



LAWN MOWER

when four play. It should be laid on a level surface of turf or firm ground. The court is marked out with white lines indicating the boundaries, and the space is divided in the middle by a net 3 feet in height, stretched across from one side to the other. The accompanying diagram, in which AB represents the net, shows a court properly laid out. When two play, the narrow court CDEF only is used; when four play, the entire court, GHJK. A consultation of the accompanying diagram will make this clear. The racket is 8 inches wide and 15 inches long.

The object of the game is to knock the ball with the racket into the opponent's court, so that he cannot return it. Whenever this is accomplished, a score is made. The first point won by either side counts 15. The second point for either side makes the score 30, and the third, 40. The fourth point wins the game, unless each side has at one time won three points, which would make the score of both teams 40. When the sides are tied at 40, the score is said to be *deuce*, and one side must win two points in succession in order to win the game. A *set* is played when either side has won six games, the side first winning this number of games winning the set. One modification of this statement is necessary. If in any set both sides have won



five games, this becomes a *deuce set* and neither side is the winner until it has won two games in succession. Most matches are played for the best two out of three, or three out of five, sets.

At the beginning of the game one player takes the ball and *serves* it; that is, he throws it into the air and knocks it with the racket over the net and into the small square on the opposite side, near the net and diagonally opposite the server. It must be returned by the other player on the first bound after it strikes the ground. The server then returns the ball, either before it strikes the ground or on the first bound afterward. The player who first misses the ball or knocks it outside of the outside lines or fails to knock it over the net, loses the point. There are numerous rules which govern the niceties of plays, and these may be learned from a manual of the game.

Lawn tennis is an excellent game, requiring great activity and skill and giving vigorous exercise of the lighter type. It is played extensively by both sexes, and there are numerous local tennis associations, as well as a national association, which conduct popular contests.

Lawrence, KAN., the county-seat of Douglas co., 40 mi. w. of Kansas City, on the Kansas River and on the Atchison, Topeka & Santa Fé and the Union Pacific railroads. It is the seat of the state university (See KANSAS, UNIVERSITY OF) and of the Haskell Institute, a national industrial school for indians, which occupies a site of 600 acres. The city has many attractive buildings and conducts a large trade with the surrounding agricultural section. The manufactures include flour and paper mills, creameries, foundries, machine shops and wood-working establishments. Lawrence was founded by the Emigrant Aid Society in 1854, after the passage of the Kansas-Nebraska Bill, and was for a time the headquarters of the antislavery party in the territory. Population in 1905, 11,708.

Lawrence, MASS., one of the county-seats of Essex co., 26 mi. n. w. of Boston, on both sides of the Merrimac River and on six lines of the Boston & Maine railroad. The Common, which is the largest public park, contains a fine monument in honor of the soldiers of the Civil War. Glen Forest, on the banks of the Merrimac, is a popular park resort. There are various



TENNIS RACKET

educational and numerous charitable institutions, besides a large public library. Prominent buildings include the city and county courthouse, a state armory, numerous factories and the Odd Fellows' Building.

The first settlement was probably made here about the middle of the seventeenth century, but the modern city dates from the construction of the great dam across the Merrimac. The city has long been known for its extensive manufactures of cotton and woolen goods, including shirtings, calicoes, flannels, broadcloths and other goods. There are various other establishments, including paper mills, foundries and carriage, engine, sewing machine and other factories. The town was incorporated in 1847 and was chartered as a city in 1853. Population in 1905, 70,050.

Lawrence, AMCS (1786-1852), an American merchant and manufacturer, born in Groton, Mass. In partnership with his brother Abbott, he established in Boston a very large dry goods business, which became the leading wholesale mercantile establishment in the country. He also was influential in the upbuilding of the cotton manufactures at Lowell and Lawrence, Mass. In 1831 he retired and engaged in acts of benevolence, expending \$640,000 for charitable purposes.

Lawrence, JAMES (1781-1813), an American naval officer, born at Burlington, N. J. In 1798 he entered the United States navy as midshipman. He served under Commodore Bainbridge in the War of 1812 and as commander of the *Peacock* captured the *Hornet*. This victory gained for him the command of the *Chesapeake*. But a few days after taking command of this ship he engaged in battle with the British ship *Shannon*; his ship was captured and he was killed. While he was being carried below he said, "Don't give up the ship," words which were afterward adopted as a motto in the navy.

Lawrence, JOHN LAIRD-MAIR, Lord (1811-1879), governor-general of India. His rare administrative ability as chief commissioner of the Punjab enabled him to obtain such an influence over the Sikhs that in the Indian Mutiny of 1857 he was able not only to keep the Punjab quiet, but to collect native forces and send them to assist in the capture of Delhi. His services were rewarded by an appointment to the governor-generalship of India in 1863, and later he was created Baron Lawrence.

Lawrence, THOMAS, Sir (1769-1830), an English painter, born at Bristol. He was the

son of an innkeeper and at an early age gave striking proof of his talent for art. George III made him court painter, and in 1815 knighthood was conferred on him. His portraits of notable persons are his best works. Among them are portraits of Pius VII, Mrs. Siddons, Benjamin West and George IV.

Law Schools, educational institutions for preparing students for the legal profession. The first law school established in America was at Litchfield, Connecticut, in 1784. This was an entirely independent institution and continued for about fifty years, when, in 1833, it suspended. During this time it was very influential, and many of its graduates came to occupy prominent positions in the state and national governments. The beginning of law schools as departments of the different colleges was in the form of courses of lectures on law, delivered in such institutions as the College of Philadelphia, Columbia and Harvard. Later, law departments were organized in these institutions, and these finally became law schools. In addition to schools of this nature, there are in the large cities of the country many independent law schools having courses similar to those connected with the universities. The standards for admission vary somewhat in different states. The best schools require a college course as preliminary to their work, and the law course occupies from three to four years. There are other schools that admit students without this preparation and do much more elementary work.

Lawsuit, *law'sute*. See PROCEDURE.

Law'ton, HENRY WARE (1843-1899), an American soldier, born at Manhattan, Ohio. He entered the Union Army in 1861 and served during the Civil War, attaining the brevet rank of colonel. In 1866 he was commissioned second lieutenant in the regular army, and later he was made inspector-general, with the rank of major. At the beginning of the Spanish War he was promoted to the rank of brigadier-general of volunteers and commanded the division that captured El Caney, July 1, 1898. The next year General Lawton was sent to the Philippines as second in command and rendered valuable service in putting down the Filipino rebellion. He was killed in an attack on San Mateo in December, 1899.

Lay'ard, AUSTIN HENRY, Sir (1817-1894), an English archaeologist, diplomatist and traveler. In 1839 and following years he traveled in the East and began his celebrated excavations on the site of ancient Nineveh. The material which

he discovered was sent to the British Museum, and the results of his search were described in his works, *Nineveh and its Remains* and *Nineveh and Babylon*.

Laz'arus (God hath helped). 1. The name of the beggar in the parable of the rich man and Lazarus (*Luke* xvi, 19-31). 2. The brother of Martha and Mary. Jesus raised Lazarus from the dead (*John* xi, 1-44).

Laz'urite. See LAPIS LAZULI.

Lead, *led*, a soft metal of bluish-gray color, which, when cut, has a bright metallic luster, but soon tarnishes on exposure to the air. Lead is about eleven and one-third times heavier than water and is easily indented or bent, but is not elastic. It is somewhat ductile and quite malleable, but it is not strong. Lead melts at a temperature about three times that of boiling water, but it contracts on solidifying, and for this reason it is not suitable for castings.

Lead ore is quite generally distributed, but it is found in paying quantities in only a few localities. The most important ores are the *sulphide*, or *galena*, sometimes known as *lead glance* (See GALENA), and the *carbonate*, which often contains considerable silver and copper. Such ore is worked for the different metals which can be obtained from it; hence, considerable silver is obtained in the reduction of lead ore, and considerable lead in the reduction of silver ore. The United States leads all countries in the production of lead.

Lead is used for lining tanks and tea chests, in the manufacture of lead pipe and in making numerous alloys and compounds, such as solder, Britannia metal, powder, shot and type metal, which is a compound of lead and antimony. A number of compounds of lead are also in general use. Of these, the oxides, *litharge* and *red lead*, are used in paints and the manufacture of glass, and the carbonate of lead, or *white lead*, forms the basis of many paints. *Lead acetate*, or *sugar of lead*, is used in coloring and sometimes for medicine. See LEAD POISONING.

Lead, an instrument used on shipboard for discovering the depth of water. It is composed of a large piece of lead, shaped like an elongated clock weight, from seven to eleven pounds in weight, and attached to a line, generally of twenty fathoms length, called the *lead line*. This is marked at certain distances to ascertain the depth in fathoms. When the depth is great, the *deep-sea lead*, weighing from twenty-five to thirty pounds, is used. The line, which is much longer than the former and is called the *deep-*

Lead

sea line, is marked by knots every ten fathoms and by a smaller knot every five fathoms. See **SOUNDING**.

Lead, *lead*, S. D., a city in Lawrence co., about 18 mi. from the western boundary of the state, on the Chicago, Burlington & Quincy and the Chicago & Northwestern railroads. It is situated in the Black Hills, near gold mines, of which the Home Stake is the largest and the most famous. Mining is the chief industry, but there are also manufactures of mining tools and camping supplies. The city has public and parish schools, a business college, the Hearst Library, the Lead Coliseum and several churches. It was settled in 1876 and was incorporated the next year. Population in 1900, 6210; estimated in 1903, 11,000.

Lead, *led*, **Glance**. See **GALENA**.

Lead Poi'soning is caused by the presence of lead in the system. Lead is often contained in water or other beverages which have been in lead pipes or vessels, and it is not infrequently found in confectionery which has been colored and in wine that has been sweetened by lead preparations. Sufficient lead may be taken from any one of these sources to cause more or less serious illness, but the most frequent and virulent cases occur among painters and persons engaged in white lead factories. The effects of poisoning may manifest themselves in severe colic or in a species of rheumatism, or, far more serious, in paralysis or, rarely, in brain diseases that terminate in delirium, convulsions and death. Opium and cathartics are the chief medicines used.

Leadville, *led'vil*, COLO., the county-seat of Lake co., about 80 mi. s. w. of Denver, on the Colorado Midland, the Denver & Rio Grande and the Colorado & Southern railroads. The city is picturesquely located at an elevation of 10,200 feet, between the Saguache and Mosquito ranges of the Rocky Mountains. Rich placers were discovered here in 1860 in California Gulch, but in a few years they were almost exhausted and the camp was practically abandoned, when, in 1877, rich silver and lead deposits were discovered. It then became widely known as a silver camp. After the decline in silver late in the nineteenth century, attention was again turned to gold mining, and for years the district has been a heavy producer of gold, also of zinc, copper, bismuth and manganese. The city contains large sampling, refining and reduction works and smelting furnaces. The principal business streets are "surfaced"; gas and

Leasé

electricity are supplied by private enterprise, good public schools are maintained, and the city has two theaters, several hospitals, about a dozen churches and a Carnegie library. A United States fish hatchery is located here, and the government has recently erected a commodious postoffice building. Population in 1900, 12,455.

Leaf Insects, popularly known by the name of *walking leaves*. Some of them have wing-covers so closely resembling the leaves of plants that they are easily mistaken for them. The eggs, too, have a curious resemblance to the seeds of plants, and certain wingless species look like slender twigs. Leaf insects are for the most part natives of the East Indies, Australia and South America. Males have long antennae and wings and can fly; females have short antennae and are incapable of flight. See color plate, **MIMICRY**.



LEAF INSECT

League, *leeg*, a measure of length which varies in different countries. The English land league is 3 statute miles, and the nautical league is 3 equatorial miles, or 3.457875 statute miles. The French metric league is reckoned as equal to 4 kilometers, or 4374 yards.

Lean'der. See **HERO**.

Leap Year, a year which has 366 days. It is so named because it leaps over a day more than a common year. Thus, in common years, if the first day of March is on Monday in the present year, it will the next year fall on Tuesday; but in leap year it will leap to Wednesday, for every leap year has a day added to the month of February. Every year which is exactly divisible by four is a leap year unless the number representing the year terminates in two ciphers, in which case it must be divisible by 400 in order to be a leap year.

Lease, *lees*, a permission to occupy lands or tenements for life or for a certain number of years or during the pleasure of the parties making the contract; also, the contract itself. The party letting the lands or tenements is called the *lessor*, the party to whom they are let, the *lessee*, and the compensation or consideration for

the lease, the *rent*. A lease for a period varying in different places from one to three years may be by verbal contract, but for a longer period it must be in writing. A breach of any of the covenants contained in a lease was formerly sufficient to render it void, but now any breach may be compensated by a money payment. The power to lease necessarily depends upon the extent of the lessor's interest in the property to be leased. A proprietor who has only a life estate can of course lease his property only during his life. A lease creates a certain set of legal relations between landlord and tenant, or lessor and lessee, such, for instance, as the duty of the former to defend his tenant's title and the duty of the latter to make necessary repairs and prevent unnecessary waste. The lease, however, may contain certain other agreements, not necessarily implied in the relation of landlord and tenant; and the latter relation may, on the other hand, exist without the basis of a lease. See TENANT.

Leather, *leth'ur*, the dressed skins of animals, prepared by tanning, tawing or other similar processes. Most leather is made from the skins of cattle and horses, but the skins of asses, pigs, goats and sheep are also used. The leather made from the skins of large animals, such as the horse and the ox, takes the name *hide*, combined with the name of the animal, as *cowhide* and *horsehide*, while that from the skins of small animals is named by combining the word *skin* with the name of the animal, as *sheepskin* and *calfskin*.

TANNING. When received by the tanner, hides are in various conditions. Those coming from a distance are usually cured by salting or drying, sometimes by both processes. Before they can be tanned the cured hides need to be brought back as far as possible to the condition of fresh hides. This is done by soaking and softening them in water, to which, sometimes, salt or carbolic acid is added. Softening is generally hastened by the use of machines, which subject the skins to a kneading process. The hair is then removed by the use of lime, the customary method being to spread the hides in a tank containing milk of lime and to expose them frequently to the air. After the hair has been loosened by this process, it is scraped from the hides, either by hand or by machines.

After being thoroughly cleansed to remove all traces of lime or other matter, the skins are placed in the tanning vats, which contain a solution made by soaking ground oak or hem-

lock bark in boiling water. The skins are first placed in a weak solution of the liquor, and as the process continues they are changed from this to one a little stronger, and so on until the process is completed in the liquor of greatest strength. This gradation is necessary to secure a thorough tanning of the hide and to prevent the formation of hard and brittle leather. The tanning of large hides from horses and cattle requires from four to twelve months by this process. Skins from smaller animals can be tanned much more quickly. In some works a chemical process which is much more rapid is now employed, especially for the manufacture of the leather used for the uppers of shoes and other purposes where great strain is not required. Sheepskins and goatskins are prepared by a process called *tawing*. In this process bran and alum take the place of the tan bark and produce a very soft, pliable leather, which is extensively used in making gloves and mittens and the uppers for women's shoes.

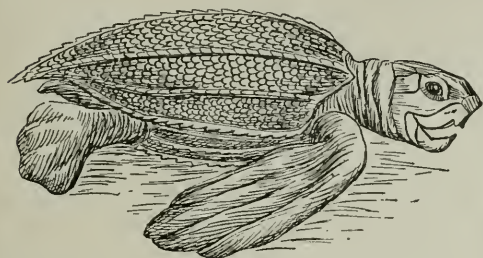
KINDS OF LEATHER. Sole leather is made from the thick parts of horsehide and cowhide, found along the back. Uppers are made from the thin portions of these skins or from the skins of smaller animals, such as calf, sheep and goat. From goatskins various grades of *kid* and the so-called *Morocco*, extensively used in book binding and making pocketbooks, are made. An imitation Morocco is also made from sheepskin. *Cordovan* is made from horsehide and is waterproof. *Patent leather* is made by treating the tanned skin with coatings of lampblack and oil, each of which is allowed to dry, and by rubbing down with pumice stone. The finishing coat contains varnish, after the application of which the leather is baked.

The United States manufactures the best leather in the world and exports it in large quantities. In order to meet the demand for this product, hides are imported from Australia, Argentina and other countries. See TANNING.

Leather, **ARTIFICIAL**, the name for certain materials which resemble leather in general appearance and are used for practically the same purposes. The demand for leather exceeded the supply, and it was necessary to produce some article which could take its place. The first article of this kind was made in America in 1849 and was called *leather cloth*. The method is as follows: The cloth is covered with oily pigments, is then dried in a heated oven and after passing between rollers is covered with pumice dust, to make it smooth, after which it is coated several

times with enamel paint. Another kind is made of leather parings and shavings; which, on being reduced to a pulp, are molded into various objects. Still another kind, called *vegetable leather*, consists of caoutchouc, dissolved in naphtha and spread over linen cloth. This kind is especially strong and durable.

Leatherback or **Leatherback Turtle**, a marine turtle found in all tropical seas, but most frequently in the western part of the Atlantic Ocean. It sometimes comes as far north as Long Island, in the United States, and France,



LEATHERBACK

in Europe. This is the largest turtle known, and specimens measuring $6\frac{1}{2}$ feet in length and weighing upwards of a thousand pounds have been found. The brown shell is soft and leathery. The flesh is not suitable for food.

Leatherwood, **Moosewood** or **Wicopy**, a bush common in the United States, with small yellow flowers, flexible jointed branches and a tough, leathery, fibrous bark, which is used by the indians for thongs.

Leavenworth, *lev'en wurth*, KAN., the county-seat of Leavenworth co., 26 mi. n. w. of Kansas City, on the Missouri River and on the Atchison, Topeka & Santa Fé, the Chicago, Burlington & Quincy, the Union Pacific, the Chicago, Rock Island & Pacific, the Missouri Pacific and the Leavenworth, Kansas & Western railroads. The city is in a farming region near valuable coal mines and has a very extensive trade. The manufactures include brick, stoves, furniture, machinery, flour and wagons. Fort Leavenworth, a large military post, established in 1827, is north, and the national soldiers' home is just south, of the city. The principal structures are the Cathedral of the Immaculate Conception, a city orphanage and two hospitals. The city has a high school, several modern ward school buildings, Mount Saint Mary's Academy and the Whittier Library. The first newspaper in Kansas, *The Herald*, was published in Leavenworth in September, 1854. Leavenworth was

settled by Southern sympathizers in 1854 and was chartered the next year. During the slavery agitation it was a strong pro-slavery center. Population in 1906, 22,167.

Leaves, *leevz*, may be said to be the lungs of plants. They are arranged on the branches in a certain definite, regular order, always the same in the same species. Usually as they grow they arrange themselves in this definite order, so as to expose the largest possible surface to light and moisture. The size and shape of leaves seems to be dependent upon the locality which the plant favors. As they are the organs of evaporation, the upper surfaces are glazed, while the pores are on the under surface of the leaf; and in very dry regions or where the sun is hot and clouds rarely intervene, the leaves may be very much reduced in size, glazed on both surfaces, or may disappear entirely from the plant. A typical leaf consists of an expanded blade and a stem, with, in some species, two small bracts at the base. The blade may be a simple and rounded expansion of the stem, with a perfectly smooth outline, or it may be notched or cut and divided, or in any one of the hundreds of intermediate shapes, even to the delicately dissected feather-like leaf of the acacia. The leaf performs four functions in plant economy: First, it makes starch; second, it assimilates the prepared foods; third, it throws off the water which has served its purpose in plant circulation, and fourth, it brings oxygen into contact with living plant cells. See CHLOROPHYLL.

Lebanon, PA., the county-seat of Lebanon co., 26 mi. e. of Harrisburg, on the Philadelphia & Reading and other railroads. The city is in the Lebanon Valley between the Blue and the South Mountains, near the famous Cornwall iron mines. There are also deposits of brownstone, limestone and brick clay in the vicinity. The industries are chiefly mining, quarrying, brick-making and manufacturing of silk, machinery, nuts and bolts, chains and other articles. The city has four public libraries, a business college, a school of telegraphy and a number of churches. The place was settled by Germans about 1700. It was incorporated in 1820 and was chartered as a city in 1885. Population in 1900, 17,628.

Lebanon, MOUNTAINS OF, two nearly parallel ranges in the north of Palestine, extending parallel with the coast of the Mediterranean. The range on the west is called Lebanon, and that on the east, Anti-Lebanon. The former is by far the loftier range of the two and presents an almost continuous ridge, the loftiest summit

of which is over 10,000 feet above the sea. Though under the snow limit, snow and ice remain throughout the year in the higher ravines. The ranges were formerly famous for their cedars, but there are now but a few hundred of the trees left. In the southern part of the chain the Upper Jordan has its source. See PALESTINE.

Lebrun, le brôn', CHARLES (1619-1690), a French painter and architect, born in Paris. He studied first with French artists and later went to Rome. Returning to France in 1642, he was immediately honored with the commission to reconstruct part of the Louvre, which had been destroyed by fire. During the reign of Louis XIV he possessed great influence, having charge of all the artistic enterprises of the king, including the decoration of the palace and park at Versailles. Another important undertaking was the construction and decoration of the Chateau of Marly, which was destroyed, but the designs of which have been preserved. Besides his architectural and decorative work, he painted numerous portraits and historical pictures, many of which hang in the Louvre and other principal European galleries.

Lecky, WILLIAM EDWARD HARTPOLE (1838-1903), an English historian, born in Ireland and educated at Trinity College, Dublin. His *Leaders of Public Opinion in Ireland* was published anonymously, but with the publication, four years later, of the *History of the Rise and Influence of the Spirit of Rationalism in Europe*, he gained a wide reputation. He became the representative of the University of Dublin in Parliament, where he attained distinction as a speaker and later was called to the Privy Council, but resigned in 1902. His best works besides those mentioned are *History of European Morals from Augustus to Charlemagne*, *History of England in the Eighteenth Century* and *Democracy and Liberty*.

Leclaire, le klair', EDNÉ JEAN (1801-1872), a French merchant and economist, considered the founder of the system of profit sharing. He began as a painter in Paris and soon built up a large business. In 1842 he announced his plan to share the profits of his business with his employes, giving each about \$50. After 1853 a mutual aid society, which he had established much earlier, was supported from the profits of the concern, instead of from contributions of the individual members, as previously. Some years later an old age pension system was created. The establishment which he founded is still prosperous.

Lecompton Constitution, a constitution adopted by a convention held at Lecompton, Kan., in 1857. It contained provisions declaring the legality of slavery in Kansas, prohibiting emancipation and forbidding the amendment of the instrument for seven years. The only portion submitted to the vote of the people was the question of the extension of slavery in the state, the rights of the present slave owners being declared inalienable. In the election the constitution was adopted, the free-state men declining to vote and the slavery vote being swelled by Missouri voters. In an election over the same instrument held under the auspices of the free-state legislature, the constitution was rejected in January, 1858. After a long contest in Congress it was voted that it should be again submitted to the people and the acceptance of the constitution was a prerequisite for admission. It was again rejected, however, and an anti-slavery constitution was adopted in 1859. See KANSAS, subhead *History*.

Le Conte, le kont', JOSEPH (1823-1901), an American geologist, born in Liberty County, Ga., and educated at Franklin College and the College of Physicians and Surgeons in New York City. At Harvard University he studied under Agassiz, whom he accompanied on a scientific expedition to Florida. Later he was made, successively, professor of natural science in Oglethorpe University, professor of natural history in Franklin College, professor of chemistry and geology in the University of South Carolina and professor of geology in the University of California, which position he held until his death. He did much towards popularizing geology throughout the country and wrote many valuable works, among which are *Religion and Science*; *Elements of Geology*; *Compend of Geology*; *Evolution, Its Nature, its Evidence and its Relation to Religious Thought*.

Lee, ARTHUR (1740-1792), an American diplomatist, brother of Richard Henry Lee and Francis Lightfoot Lee, born in Virginia. He completed his education in England and at the University of Edinburgh and, returning to America, began the practice of medicine at Williamsburg, Va. Later he studied law in London and practiced his profession there, but was an earnest opponent of the policy of Great Britain in regard to the colonies, and succeeded Benjamin Franklin as the agent of Massachusetts. Later he was the secret emissary of the Continental Congress in England and France and was the acknowledged United States minister



ROBERT E. LEE

in France and Spain, being one of the commissioners who signed the treaty of alliance in 1778. After returning to America in 1780 he held numerous state and national offices.

Lee, CHARLES (1731-1782), an American Revolutionary general. He was the son of a British officer, took part in Braddock's campaign in 1755 and served during the last French and Indian war. He then returned to England, but removed to America in 1773, and on the outbreak of the war he was appointed major general, by Congress. He took part in the siege of Boston, commenced the fortifications around New York and was given credit for the victory at Charleston in 1776. He was captured in the autumn of that year, but was exchanged in time to take a command in the Battle of Monmouth. His conduct at that time led to his reprimand and finally to his dismissal from the army.

Lee, FITZHUGH (1835-1905), American soldier, nephew of Robert E. Lee, born in Fairfax Co., Va. He graduated at West Point and saw some service in the Federal army, but at the outbreak of the Civil War he joined the Confederate forces and rose to the rank of major general before the close of the war. He was elected governor of Virginia in 1885 and held the office until 1890. In 1896 President Cleveland appointed him consul-general at Havana, and he was asked to remain at that post when President McKinley came into office. He returned to the United States at the outbreak of the war with Spain and was appointed a major general by President McKinley. In 1899 he was made military governor of Havana.

Lee, FRANCIS LIGHTFOOT (1734-1797), an American statesman, one of the signers of the Declaration of Independence. He was born in Virginia, a brother of Richard Henry Lee and Arthur Lee, and was for ten years a member of the Virginia House of Burgesses and later sat in the Continental Congress. After the Revolutionary War he retired to private life.

Lee, HENRY, called *Light Horse Harry* (1756-1818), an American Revolutionary general, born at Leesylvania, Va., and educated at Princeton College. In 1776 he was appointed captain of a company of cavalry in Colonel Bland's Virginia regiment, and in the following year he joined Washington's army just before the Battle of Brandywine. He served through the war as scout, and he had command of the brilliant expedition against the British at Paulus Hook. In the memorable retreat of Greene before Lord Cornwallis, Lee's legion acquired fame as the

rear guard of the American army, the post of greatest danger, and at the battles of Guilford Court House and Eutaw Springs, Lee especially distinguished himself. On the conclusion of the war he was sent to Congress as a delegate from Virginia, and in 1792 he was chosen governor of that state. In 1801 he retired from public life.

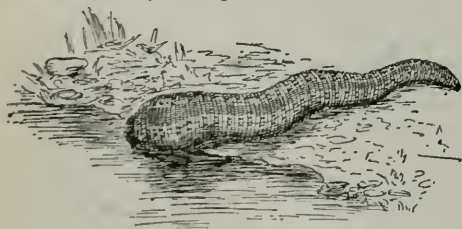
Lee, RICHARD HENRY (1732-1794), a distinguished American of the Revolutionary era, born at Stratford, Westmoreland County, Virginia. He was chosen a delegate to the House of Burgesses, and in the opposition to unjust British claims he played a most important part. On being sent as delegate to the first American congress at Philadelphia (1774), he was at once recognized as a leader in that assembly. He drew up many addresses to the king and the English people, which were admitted, even by his political opponents, to be unsurpassed by any of the state papers of the time. On June 7, 1776, he introduced the motion finally breaking political connection with Britain. In consequence of weak health, he was unable to serve in the field, but his activity as a politician was unceasing and extremely valuable, especially in his own state. In 1784 he was unanimously elected president of the Congress. He opposed the ratification of the Federal Constitution, but later entered the Senate as an Anti-Federalist.

Lee, ROBERT EDWARD (1807-1870), an American general, commander in chief of the Confederate army and one of the most skilful tacticians who took part in the Civil War. He was the son of the Revolutionary cavalry leader, "Light Horse Harry" Lee, and was born in Westmoreland County, Va. In 1829 he left the military academy of West Point with the rank of second lieutenant of engineers. After serving for a time as chief engineer of the army in Washington, and superintending the construction of defenses in New York Harbor, he was appointed in 1847 engineer in chief of the army for the Mexican campaign. His brilliant services at Cerro Gordo, Contreras, Churubusco and Chapultepec gained for him the rank of colonel. From 1852 to 1855 he was superintendent of military studies at West Point, and in 1855 he was made lieutenant colonel of cavalry.

In 1861 he became colonel of his regiment, but on the secession of Virginia from the Union he threw up his commission and, despite the fact that he was strongly opposed to disunion, accepted the command of the Virginian army and subsequently was selected by President Davis

as commander in chief. In June, 1862, he defeated the Federal army under McClellan in a series of battles around Richmond, and, aided by "Stonewall" Jackson, he defeated Pope in a number of engagements commencing August 20 and ending with the victory of Manassas Junction on the thirtieth. Lee then crossed the Potomac into Maryland to threaten Washington itself, but a series of checks obliged him to withdraw behind the Rappahannock. The plan of the Federals now was to advance on Richmond, but this was prevented by Lee, who, on December 13, defeated Burnside at Fredericksburg, and on May 2 and 3, 1863, gained the victory of Chancellorsville over Hooker. After this, Lee resolved on an invasion of Pennsylvania, but was beaten by Meade at Gettysburg, July 1, 2 and 3, and forced to retreat into Virginia. The campaign of 1864 was begun by the advance of General Grant on May 4. A succession of stubbornly contested battles followed, from the "Wilderness," by way of Spottsylvania and Cold Harbor, to Petersburg. On April 2, 1865, Grant broke through Lee's defenses, and Lee's attempt to unite with Johnston was prevented. The Union forces with their great superiority of men gradually hemmed in the Confederate army, which on April 9 surrendered to Grant at Appomattox Court House. General Lee retired into private life, but in October of the same year was elected president of Washington College, Lexington, Va., now Washington and Lee University.

Leech, the common name of certain worms, characterized by the presence of one or two



LEECH

sucking disks. The rings or segments of the body are very numerous and closely set. Leeches chiefly inhabit fresh-water ponds, though some live among moist grasses and some are marine. They breathe through the general surface of the body or through little pouches. In Ceylon are land leeches, which live in damp foliage and are often a serious pest to travelers. In those species generally employed for medicinal purposes, the mouth is situated in the middle

of the anterior sucker and is provided with three small white teeth which are capable of making a peculiar Y-shaped wound, which is difficult to close and permits a large flow of blood. A single leech may draw as much as one ounce of blood. After the leeches are sated and have detached themselves, they may be made to disgorge the blood they have drawn by placing them in a weak solution of salt. Leeches bury themselves in winter in the mud at the bottom of pools and come forth again in the spring.

Leech, JOHN (1817-1864), an English artist and caricaturist, born in London. He was educated at Charterhouse, where he became acquainted with Thackeray, who was his lifelong friend. He studied medicine, but was most proficient in his drawings, and he soon began to support himself by this means. He first published an independent volume of sketches and etchings and later became associated with *Punch*, where his works brought him to wide public notice. Later he illustrated the works of some of the greatest English authors, including both Thackeray and Dickens. He was one of the first of English cartoonists to abandon the coarse humor which had previously characterized newspaper drawings.

Lee'chee'. See LITCHI.

Leech Lake, a lake in northern Minnesota, one of the chief feeders of the Mississippi River in its early course. Its length is about 20 miles, its width, 15 miles, and its height above sea level, 1297 feet.

Leeds, *leedz*, a manufacturing town of England, on the River Aire, 21 mi. s. w. of York. Leeds has been for generations the chief site of the woolen manufacture of Yorkshire. The city is situated in a rich coal and iron district, and the iron industry is almost as important as the cloth industry. Among the chief buildings and institutions are Saint Peter's Church, Saint John's Church, the townhall, the royal exchange, a grand theater, Mechanics' Institute, Central Public Free Library and University of Leeds. Near by is the Kirkstall Abbey, a magnificent ruin. Besides cloth manufactures, there are manufactures of boots and shoes, locomotives, agricultural machines, glass, tobacco, oil, worsted, silk and pottery, while nearly a hundred collieries are worked in the district, and some of the largest tanneries in the kingdom are located here. Population in 1901, 428,968.

Leek, an odd little plant which is native in the southern mountain ranges of Europe. The

peasants used to plant leeks on the roofs of their cottages as a protection against lightning. In this particular species the stem grows to a height of eight or ten inches and bears a few purplish flowers, but the most noticeable feature is the thick, fleshy leaves, which grow in pretty clusters close to the ground. Because of the trim and compact form of these plants, gardeners grow them in large quantities and cover the ground in neat patterns which from a distance resemble paintings. Some species are edible.

Lee'ward Islands, a British colony including a number of the West Indies, divided into five administrative districts, namely, Antigua, Saint Christopher, Dominica, Montserrat and the Virgin Islands. The area of the group is 701 square miles. The capital is Saint John, in Antigua. Population in 1901, 127,434.

Leeward Islands, a name frequently applied to that portion of the West Indies which includes Porto Rico and the islands lying immediately to the west of it; also a group of islands in the Caribbean Sea, extending westward from Trinidad. See WINDWARD ISLANDS.

Legacy, *leg'a sy*, technically, a gift of personal property or of money by the will of a deceased person. It is thus distinguished from devise, which is a gift of real estate by a will. See WILL.

Le Gallienne, *legal'ly en*, RICHARD (1866—), an English journalist and author, born in Liverpool, educated at Liverpool College. He became literary critic for the *Star* in 1891 and was also associated with other papers. He first came into prominence in a religious controversy, which resulted in the publication of the *Religion of a Literary Man*, and he later attained notoriety by his attack on Rudyard Kipling's method and ability. In 1898 he came to the United States on a lecture tour and later settled in New York. Among the best of his works are *Retrospective Reviews*; *Prose Fancies*; *English Poems*; *Travels in England*, and *George Meredith, Some Characteristics*.

Le'gal Ten'der. See TENDER.

Legal Tender Cases, a series of cases before the Supreme Court of the United States, concerning the legality of the acts of Congress making United States notes legal tender. The first case, that of *Hepburn versus Griswold*, was brought from the State of Kentucky, where a court had held the act unconstitutional. The Supreme Court reaffirmed this decision in November, 1869, but after changes in the personnel of the court and an addition to its mem-

bership, the decision was reversed in May, 1871. In a later case in 1878 the question was again brought before the court on the ground that, though the act of Congress was legal as a war measure, it was not legal in time of peace. With a single dissenting vote, that of Justice Field, the court decided that the act was constitutional in both war and peace. See TENDER.

Legend, *lej'end* or *le'jend*, originally the title of a book containing the lessons that were to be read daily in the service of the early Church. The term was afterward applied to collections of biographies of saints and martyrs, or of remarkable stories relating to them, because they were read at matins and in the refectories of cloisters and were earnestly recommended to the perusal of the laity. Among the best-known collections were the *Legenda Sanctorum*, or *Historia Lombardica* and the *Golden Legend*.

Legendre, *le zhahN'dr'*, ADRIEN MARIE (1752-1833), a French mathematician; born in Paris. He was early a professor of mathematics in the military school at Paris, and in 1783 he was a member of the Academy. He particularly distinguished himself by profound investigations as to the attraction of elliptical spheroids and by his method of calculating the course of the comets.

Leghorn, a seaport of Italy, capital of the Province of Leghorn, on the Mediterranean, 62 mi. w. of Florence. Leghorn is for the most part modern and well built. Among objects of interest are the Cathedral, the Church of the Madonna, a synagogue richly ornamented with marbles, the English chapel and cemetery and the lazarettos, particularly that of San Leopoldo, which is one of the most magnificent works of the kind in Europe. The manufactures are varied. Shipbuilding is carried on, and within recent years several ironclads have been constructed in the dockyards. Leghorn was a mere fishing village when it came into the possession of the Florentines in 1421, and it continued to be a place of little importance till the sixteenth century. It now ranks among the chief ports, after Genoa and Naples. Population as a commune, 98,321.

Legion, *lej'un*, in ancient Roman armies, a body of infantry, at different periods consisting of different numbers of men, from 3000 to above 6000, often with a complement of cavalry. Each legion was divided into ten cohorts, each cohort into three maniples, each maniple into two centuries. Every legion had sixty centurions and the same number of *optiones*, or lieutenants, and

standard bearers. The standard of the legion was an eagle.

Legion of Honor, a French order for the recognition of military and civil merit, instituted by Napoleon in 1802 and inaugurated in 1804. The order has been remodeled several times, the last time just after the downfall of the Second Empire. There are now five ranks or classes: ordinary chevaliers, or knights; officers, commanders, grand officers, grand crosses. The profuse granting of the decoration of the order latterly brought the institution into discredit and the number of chevaliers is now restricted to 25,000, the officers to 4,000, the commanders to 1000, the grand officers to 200 and the grand crosses to 70. The emblem is a five-pointed star of white enamel, which bears a figure emblematic of the Republic, with the inscription "*Republique Francaise*," and on the reverse, two flags, with the inscription, "*Honneur et Patrie*" (Honor and Country).

Legislature, *lej'is la'ture*, that organ of government which has the power to make, amend and repeal laws, subject, in some cases, to an organic law, or constitution, from which it receives its powers. In the earliest times of ancient Greece and Rome, the legislative power rested with assemblies, varying in numbers from the whole body of citizens to a few chosen representatives. In the Middle Ages all the functions of government, including the legislative body, were usually united in the king, emperor or feudal lord, but during modern times there has been a gradual return to the ancient system, and in most states laws are now made by assemblies.

Legislatures of modern states, though varying widely in size and power, are agreed in essential principles. The legislature of a country usually consists of two houses, or chambers. In most states one of these is composed of representatives of the people, chosen directly by the votes of male citizens having certain qualifications, such as a certain age and, in some instances, conformity to educational and property requirements. This house generally possesses the sole power to initiate financial legislation and sometimes other legislation affecting the general interests of the people. The other house is representative of classes, as in England (the House of Lords), or of territorial divisions, as in the United States (the Senate). The members are sometimes chosen indirectly by the electors who choose representatives of the other house, and occasionally they are chosen directly by these electors. There is a general agreement as to the rights and

privileges of members of a legislative body during their terms of office, such as freedom from arrest, except for treason or other high crimes, and freedom of debate, subject only to the rules of the body. The tenure of legislators varies greatly. In some states, as in most European countries, members of the upper house serve for life or for long periods, or at the pleasure of the government of the division which they represent. The tenure of the members of the lower house of the legislature varies from one to seven or ten years, though usually it is a short period. Members of the legislature are sometimes compensated, as in the United States, but frequently are not, as in Great Britain and Germany.

Among the states of the Union different names are given to the legislative body in the state government, though it is most frequently known merely as the *legislature*. In small units of government, as in the county of the Western states, the legislative body is merged with the executive body in a board of supervisors, but in cities it is usually a separate organ, known, generally, as the *common council*.

Leguminosae, *le gu'min o'sec*, or **Pulse Family**, one of the largest and most important families of plants, including about 7000 species, which are dispersed throughout the world. They are trees, shrubs or herbs, differing greatly in habit. The largest division is characterized by a flower, called *papilionaceous*, because of its resemblance to a butterfly; a good example is the sweet pea. The fruit is usually a pod, or legume, and from this the family takes its botanical name. The leaves are usually compound and sometimes are doubly so. Wood, timber, medicine, dyes, foods and a great variety of substances used in domestic life are produced by this great family, and many species are highly ornamental in foliage or in flower. A great many of the plants of this order are described in their proper places; as, for instance, INDIGO; PEANUT; PEA; BEAN; CASSIA; ACACIA; CLOVER.

Lehigh, *le'hi*, **River**, a river of Pennsylvania which rises near Wilkesbarre, flows southeast, then northeast and joins the Delaware at Easton, after a course of about 120 miles. It is navigable for about 84 miles.

Leibnitz, *lipe'nitz*, GOTTFRIED WILHELM, Baron von (1646-1716), a German scholar and philosopher, born at Leipzig. He studied law, mathematics and philosophy at the university of his native town, where he published a philosophical essay when only seventeen years of age.

This was followed by several legal treatises and by a remarkable philosophico-mathematical treatise. After holding political appointments under the elector of Mainz he went to Paris, where he applied himself particularly to mathematics. He also went to England, where he was elected a member of the Royal Society and made the acquaintance of Boyle and Newton. About this time he made his discovery of the differential calculus (See *CALCULUS*). The duke of Brunswick-Lüneburg then gave him the office of counselor, with a pension, and after a further stay in Paris he returned to Hanover and entered upon the superintendence of the library. Being commissioned to write the history of the House of Brunswick-Lüneburg, Leibnitz went to Vienna and thence to Italy. About this time he proposed a scheme to reunite Protestants and Catholics. Having assisted the elector of Brandenburg (afterward Frederic I of Prussia) to establish the Royal Academy of Sciences at Berlin, he was made president for life. He was also made a privy counselor by the czar Peter the Great, and he proposed the plans upon which the Academy of Saint Petersburg was established. His writings were voluminous and included mathematics, science, philosophy and religious topics. A sketch of his philosophy was given by him in his *Monadologie*.

Leicester, *les'tur*, the county town of Leicestershire, England, on the Soar, 100 mi. n. n. w. of London. It is a place of considerable antiquity and was known to the Romans under the name of Ratae. Its walls and strong castle were demolished in the reign of Henry II. It suffered severely during the wars of Lancaster and York and also during the Civil War of 1642, having in the latter been first taken by storm by the royalists and then retaken by the republicans. Its manufactures consist of boots and shoes, hosiery, laces, thread and iron ware. Population in 1901, 211,579.

Leicester, ROBERT DUDLEY, Earl of (about 1532-1588), an English courtier, a favorite of Queen Elizabeth. In 1550 he was married to Amy Robsart, daughter of a Devonshire gentleman, and is said to have been accessory to her murder in 1560. Elizabeth created him earl of Leicester and privy counselor and lavishly bestowed titles and estates on him. Her fondness for him caused his marriage with her to be regarded for a time as certain. So great was the opposition that Elizabeth was obliged to renounce any intention she may have had of marrying him; but his marriage with the countess of Essex in

1578 deeply offended her. *Kenilworth*, by Sir Walter Scott, gives the story of Amy Robsart.

Leiden, *li'den*. See LEYDEN.

Leidy, *li'dy*, JOSEPH (1823-1891), a celebrated American naturalist. He was born in Philadelphia and received his education at the University of Pennsylvania. In 1846 he was made chairman of the board of curators of the Academy of Natural Sciences and also filled a position as demonstrator of anatomy in the University of Pennsylvania. Later he was made professor of anatomy in the medical school of the same university, and in 1802 he became professor of biology in the faculty of philosophy. He was elected president of the Academy of Natural Sciences at Philadelphia in 1881, and four years later became president of the Wagner Free Institute of Science. He received many honors for his work and made many valuable contributions to the natural sciences. Leidy's works include contributions to the *Transactions*, to the American Philosophical Society and to other publications, *A Flora and Fauna Within Living Animals*, *Cretaceous Reptiles of the United States*, *The Extinct Mammalia Fauna of Dakota and Nebraska* and *Treatise of Human Anatomy*.

Leif, *life*, **Ericson**. See ERIC THE RED.

Leighton, *la'ton*, FREDERICK, LORD (1830-1896), an English painter, born at Scarborough. When twenty-five years of age he sent to the Academy his picture of *Cimabue's Madonna Carried in Triumph through Florence*, which called forth general admiration. For the next four years Leighton lived in Paris, then took up his residence in London. In 1869 he was elected a Royal Academician, and in 1878 he became president of the Academy, was knighted and was named an officer of the Legion of Honor. In addition to his painting, he gained a high place as a sculptor by his *Athlete Strangling a Python* and his *Sluggard*. The special merit of his work lies in the perfection of his drawing and design, as well as in refinement in execution. Among his many works may be mentioned his *Hercules Wrestling with Death*, *The Bath of Psyche*, *The Music Lesson*, *Lachrymae*, *Cymon and Iphigenia*, *Captive Andromache* and *Ball Players*. The large frescoes at South Kensington Museum, representing the *Industrial Arts Applied to War* and the *Arts of Peace*, are also by him.

Leipzig, *lipe'tsiK*, or **Leipsic**, *lipe'sik*, the largest city of the kingdom of Saxony and one of the chief seats of commerce in Germany, is

situated on the Elster, Pleisse and Parthe, 64 mi. w. n. w. of Dresden. The market place in the old town has a picturesque appearance, having about it the old townhall (Rathaus) and other buildings in the Renaissance style. It contains a fine war monument, erected in 1888. The Augustusplatz is one of the finest squares in Germany and contains the university, the museum, the theater and the postoffice. The Pleissenburg, or castle, now used in part as a barrack, withstood the attacks of Tilly and is memorable as the scene of the famous disputation between Luther and Doctor Eck. The suburbs contain the Church of Saint John, the Church of Saint Peter and the Roman Catholic church, the Rosenthal (Valley of Roses), with pleasant wooded walks, and numerous places of recreation. The university, founded in 1409, is the third in importance in Germany and has almost 4000 students and a library of about 500,000 volumes. Schools are numerous and good, and there is a famous conservatory of music. Besides being the center of the book and publishing trade of Germany, Leipzig possesses considerable manufactures and has important general commerce, carried on especially through its three noted fairs at the New Year, Easter and Michaelmas. Leipzig early received the Reformation. In 1631 Gustavus Adolphus defeated Tilly near it, at Breitenfeld. It suffered much from the Seven Years' War. In October, 1813, the great "Battle of the Nations" was fought around and in Leipzig (See LEIPZIG, BATTLES OF). Population in 1900, 455,089.

Leipzig, BATTLES OF. Two important battles were fought near Leipzig during the Thirty Years' War, and one during the war against Napoleon. The first was in September, 1631, and resulted in the defeat of the imperial army, under Tilly, by the Protestants, under Gustavus Adolphus. This was the first great victory which the Protestants had won. The second battle took place in November, 1642, and was also between the Swedes and the imperialists. The imperialists were again defeated.

In October, 1813, a great battle was fought at Leipzig between Napoleon and the Austrians, Prussians, Russians and Swedes. This battle, which was known as the "Battle of the Nations," resulted in a complete defeat for Napoleon.

Leith, leeth, a town of Scotland, situated on the Firth of Forth, 2 mi. n. of Edinburgh, of which it is a seaport. Among the chief buildings are the Trinity house, the customhouse, the

royal exchange and the townhall. Towards the west of Leith is an important fort. The harbor extends more than a mile into the firth and is well built. Among the manufactures are ships, machinery, sailcloth, ropes, ale, soap and flour. The history of Leith is to a large extent connected with that of Edinburgh. Population in 1901, 76,600.

Le'land, CHARLES GODFREY (1824-1903), an American author, born at Philadelphia. He studied law and was admitted to the bar, but after successfully writing for magazines for a time, he gave up the law entirely for a literary life. He is best known through his quaint *Hans Breitmann Ballads*, in Pennsylvania Dutch, and his works on the language and poetry of the gypsies.

Leland Stan'ford Junior University, a coeducational institution of higher learning, located at Palo Alto, Cal., 33 mi. s. of San Francisco. This university was founded by Leland Stanford and his wife in memory of their only child, Leland Stanford, Jr., who died in 1884. The university was opened to students in 1890. The endowment, which at first consisted of about 81,000 acres of land and \$2,500,000, was increased, after Mr. Stanford's death, to about \$30,000,000. The university maintains departments of Greek, Latin, Germanic languages, Romance languages, English, psychology, philosophy, education, economics and social science, law, history, drawing, mathematics, civil, mechanical and electrical engineering, mining, physics, chemistry, botany, physiology and hygiene, zoology and geology. The Hopkins Library of Natural History, located at Pacific Grove, is also a branch of the biological department of the University. The usual class divisions are not recognized, and students graduate whenever they have completed the work required for the degree for which they are studying, regardless of the amount of time spent at the university. The buildings are patterned after the old California missions and are arranged around two quadrangles. The material used is gray stone, with red tile for roofing. This combination, together with the arrangement of the buildings, makes Leland Stanford one of the most attractive universities in the country. The beautiful memorial chapel was destroyed and a number of the other buildings were badly damaged by the earthquake which occurred April 18, 1906, but plans for their rebuilding were made at once. The attendance is about 1500; the library includes over 80,000 volumes.

Le'ly, PETER, Sir (1617-1680), a German painter, born at Soest, in Westphalia. He was first instructed by Peter Grebber at Haarlem, but went to England in 1641 and commenced portrait painting. He painted portraits of Charles I and of Cromwell, but it was not until the Restoration that he rose to the height of his fame. He was in great favor with Charles II, who knighted him. The finest of his few historical works is the *Susannah and the Elders*, at Burleigh House.

Leman, *le mahN'*, LAKE. See GENEVA, LAKE OF.

Le Mans, *le mahN'*. See MANS, LE.

Le Mars, *le mahrz'*, IOWA, a city and the county-seat of Plymouth co., on the Illinois Central and the Chicago, Saint Paul, Minneapolis & Omaha railroads, 25 mi. n. by c. of Sioux City. Western Union College is located here. The chief manufactures are flour, drills, foundry and machine shop products, brick and cigars. Population in 1905, 5041.

Lemberg, *lem'berK*, a city of Austria-Hungary, capital of Galicia, 365 mi. e. n. c. of Vienna. It is the seat of a Roman Catholic, an Armenian and a United Greek archbishop. It has a university with an attendance of over 2000 and a library of about 180,000 volumes; and the Ossolinski National Institute has a library of over 100,000 volumes. The manufactures are extensive and varied, and there is a large trade, which is chiefly in the hands of the Jews, who number more than 30,000. Population in 1900, 159,618.

Lem'ming, a burrowing animal, much like the rat. There are several species, found in Norway, Lapland, Siberia and the northern parts of America. The best-known species is the *common*, or *European*, *lemming*, of which the body color is brownish, variegated with black, while the sides of the head and belly are white or of a grayish tint. The legs and tail are gray. The lemming feeds on plants and is exceedingly destructive to vegetables and crops. Vast hordes, at intervals ranging from five to twenty-five years, migrate toward the Atlantic and the Gulf of Bothnia, destroying vegetation in their path. Bears, wolves and foxes make them their prey while they are migrating. One species, called the *banded lemming*, is found in the Hudson Bay region of North America. Like some other fur-bearing animals inhabiting cold countries, it turns white in winter.

Lem'nos, the most northerly island of the Grecian Archipelago, between the Hellespont and

Mount Athos. It has an area of about 175 square miles and abounds in vines, wheat, fruits and tobacco. The principal town is Lemnos or Kastro. The volcano, Mosychlus, was at one time active and was regarded as the workshop of Vulcan. Population of the island, about 30,000.

Le Moine, *le mwah'n'*, JAMES MACPHERSON, Sir (1825-), a Canadian author and naturalist. He was born in Quebec and received his education at Le Petite Séminaire de Quebec. In 1850 he was admitted to the bar. His first public position was collector of inland revenue at Quebec, and later he became inspector. Much of his time has been spent in the study of natural history, especially the study of birds, and he has made many careful researches and investigations and has written many books, among which are *The Ornithology of Canada*, *Legendary Lore of the Lower Saint Lawrence*, *Maple Leaves and Quebec, Past and Present*.

Lem'on, the fruit of the lemon tree, closely resembling in its structure the orange. The lemon is a native of India, but it is now extensively cultivated in the south of Europe and in Florida and California. The lemon tree is a knotty-wooded tree of rather irregular growth, about eight feet high. The leaves are oval and contain an oil which is of some value in making extracts and for other purposes. The fruit is oblong, and the juice is very sour, though when the fruit is ripe it is agreeable. It ripens in winter, but since the lemon is in greatest demand during the summer, the ripened fruit is preserved under cold storage. The fruit does not ripen well on the tree; hence it is picked green and allowed to mature slowly in a darkened room. Lemons are used for flavoring beverages and numerous articles of food; also in calico printing and in the manufacture of citric acid. Lemon extract, common in cookery, is made by expressing an oil from the peel or extracting the oil by soaking the peel in alcohol. See FRUITS, *color plate*, Fig. 16.

Lemon, MARK (1809-1870), an English humorous and dramatic writer. He made his first literary essays in the lighter drama, supplying the London stage with more than sixty farces, melodramas and comedies. With Henry Mayhew he established *Punch* in 1841, and two years later he became sole editor. He was also literary editor of the *Illustrated London News* and an occasional writer for Dickens's *Household Words* and other periodicals. Among his later productions are some novels of average merit.

Le'mur, the name generally applied to a family of animals between the monkeys and the apes. There are about fifty species, all of which live in Africa or Madagascar and neighboring islands. The fur is soft and delicate and usually of a light color, and the tail is long. Lemurs vary from the size of a cat to that of a mouse.



LEMUR

The *ring-tailed lemur*, a species which lives on cliffs and along the sea, is gray in color, with black and white rings about its tail. The *ruffed lemur* is the largest of the lemurs; the *mouse lemur* is about the size of a rat; the *avahis* is about a-foot long, with a tail 15 inches in length; it lives a solitary life and appears only at night. The *indris* is of a black color, with white upon the rump and limbs. The natives of Madagascar call this lemur the *dog of the forest*, because its howls resemble those of a dog, and also from the fact that in some parts of the island it is tamed and used to chase birds.

Lemurs are harmless little creatures and are easily tamed, but the peculiar appearance of the face, their large eyes and their habit of feeding at night made them objects of superstition and awe, and gave them the name lemur, which means ghost. See AYE-AYE; LORIS.

Le'na, a river of Siberia. It rises west of Lake Baikal, flows northeasterly, then north-

westerly and enters the Arctic Ocean through several mouths. Its total length is 2700 miles. Its chief tributaries are the Aldan, the Olekma, the Vilim and the Vilyui. Eight hundred miles from the ocean the Lena attains a width of five or six miles, and it is generally navigable during the open season. It is free from ice between Yakutsk and Kirensk from the middle of May to the middle of November, and during this season it is navigable for steamers between these points. The Lena is one of the largest rivers of Asia and the largest within the boundaries of Siberia. It drains an area of about a million square miles.

Lenni-Lenape, *len'ne le nah'pay*. See DELAWARE (indians).

Le Nôtre, *le no'tr*, ANDRÉ (1613-1700), a French landscape artist, born in Paris. His first important work was the arrangement of the grounds of the Chateau de Vaux. This brought him instant recognition from Louis XIV and other prominent persons, and he was continuously employed in laying out some of the finest grounds in France. He also planned the gardens of the Vatican and the Quirinal, in Rome, and the Saint James and Kensington gardens, in London.

Len'ox, JAMES (1800-1880), an American philanthropist, born in New York City. He was educated at Columbia College and was admitted to the bar. Having inherited from his father several millions of dollars, for half a century he devoted himself to the forming of a library and gallery of paintings. This he conveyed to New York City in 1870, having erected a beautiful structure to receive it. He was a liberal donor to many churches and societies.

Lens, *lenz*, a transparent body having at least one curved surface. Lenses have either one

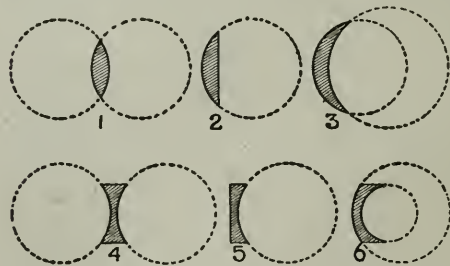


FIG. 1

plane and one spherical surface, or two spherical surfaces. If the surface curves outward, the lens is *convex*; if inward, it is *concave*. There are six kinds, as shown in Fig. 1.

1. Double-convex lens; both surfaces convex

2. Plano-convex lens; one surface convex and one plane.

3. Concavo-convex lens; one surface convex and one concave.

4. Double concave lens; both surfaces concave.

5. Plano-concave lens; one surface plane and one concave.

6. Convexo-concave lens; one surface concave and one convex.

Lenses refract rays of light which pass through them. If the lens is convex, the refraction tends to bring the rays to a point, called the *focus*, as shown in Fig. 2. The parallel rays 1, 2, 3, 4 and 5, passing through the double-convex lens

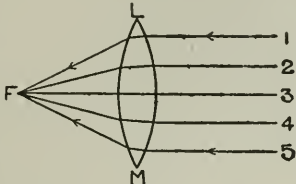


FIG. 2

LM, come to a point at *F*, which is the focus. When the rays of the sun are collected in this way by a double-convex lens, they afford sufficient heat to set such substances as tinder, paper and dry pine wood afire. For this reason, such a lens is sometimes called a *burning glass*.

Convex lenses form two kinds of images. When the object is at a long distance from the lens, the image formed is smaller than the object, and inverted, as shown in Fig. 3. *AB* repre-

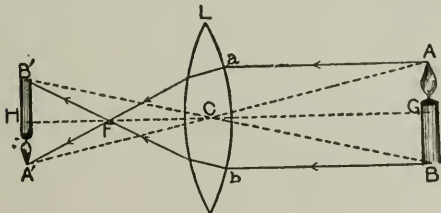


FIG. 3

sents the object. The parallel rays from *A* and *B* strike the lens respectively at *a* and *b*. *Aa* is refracted to *A'* and *Bb* to *B'*. The rays *AA'* and *BB'* strike the lens vertically and pass through its center; consequently they are not refracted. A screen placed at the point where these rays meet the refracted parallel rays will receive the image. If the screen is moved either backward or forward from this point, some of the rays are lost and the image becomes indistinct.

When the object is between the focus and the lens, the image is erect and magnified. In Fig. 4, *AB* is the object and *A'B'*, the image.

The parallel rays from *A* and *B* are refracted and meet at *F*, while the rays *A'A* and *B'B* pass through the center of the lens and are not refracted. The image appears where these rays meet the refracted

parallel rays. In this case both the object and the image are on the same side of the lens, while in the former the image is on the other side of the lens from the

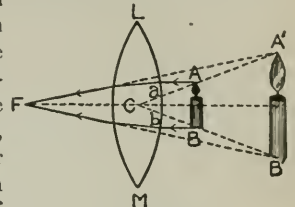


FIG. 4

object. Fig. 4 illustrates the use of the convex lens as a simple magnifying glass. The images formed by concave lenses are erect and smaller than the object. For the use of lenses, see CAMERA; EYE; MICROSCOPE; OPERA GLASS; TELESCOPE.

Lent, the forty days' fast in spring, beginning with Ash Wednesday and ending with Easter Sunday. In the Latin Church Lent formerly lasted thirty-six days, but in the fifth century four days were added, in imitation of the forty days' fast of the Saviour, and this usage became general in the Western Church. The Carnival is held just before Lent begins, and the close is celebrated in Roman Catholic countries with great rejoicings. The English Church has retained Lent and many other fasts, but gives no directions respecting abstinence from food.

Len'til, the fruit of a plant that resembles the pea vine. Two varieties are recognized; one is distinguished by its size and the greater quantity of mealy substance which the fruits afford. Lentils are flattish, rounded and, when cooked, reddish in color. They are more easily digested than peas, are very nutritious and form the chief article of diet in Egypt, Syria and other Mediterranean countries. They are not uncommon in the markets of the United States.

Le'o (the lion), a bright and interesting constellation, containing ninety-five stars, noteworthy because of its remarkable nebulae. Leo is the fifth sign of the zodiac, between Cancer and Virgo, and is entered by the sun about July 22. In ancient astrology the symbol (♌) was the breastbone or the tail of a lion.

Leo, the name of thirteen popes, of whom the following are most important: LEO I, Saint, pope from 440 to 461, was a very able ruler and strengthened the power of the papacy. When Attila took Rome in 452, Leo visited the conqueror in person and induced him to spare

the city, and three years later, when Genseric attacked the city, by his interposition he saved many of the most beautiful buildings of the city. **LEO III**, who became pope in 795, was the pope who crowned Charlemagne emperor of the West. **LEO IX**, pope from 1048 to 1054, was a learned man and devoted much attention to the correction of abuses within the Church. He firmly upheld the power and rights of the Church and thus prepared the way for the later struggle over prerogatives between the popes and the emperors. **LEO X**, Giovanni de' Medici, was the son of Lorenzo the Magnificent and became pope in 1513. His court was splendid and, like the other members of his family, he was a munificent patron of learning and art. The University of Rome was reorganized by him. It was during his reign that the Reformation broke out in Germany. At first Leo refused to take the new movement seriously, but in 1520 he went so far as to proclaim a bill of excommunication against Luther. See **LEO XIII**.

LEO XIII (1810-1903), Giovacchino Vincenzo Peretti, pope of the Roman Catholic Church, born



LEO XIII

at Carpento, Italy. He became titular archbishop in 1843, was apostolic delegate, successively, of Benevento, Spoleto and Perugia, and was bishop of Perugia in 1846. He was raised to the rank of cardinal in 1853 and appointed chamberlain of the Sacred College in 1877; the Conclave of Cardinals elected him successor to

Pius IX in 1878. The new pope at once made known his election to the powers, and his first official act, March, 1878, was to restore the Roman Catholic hierarchy of Scotland, thus inaugurating a policy somewhat different from that of his predecessor. In 1879 the pope issued an encyclical aimed at Socialists, Communists and Nihilists. The czar ordered this to be read in all the Roman Catholic churches of Russia. The policy of Leo XIII was to harmonize the diversified opinions and interests of the Church and to strengthen all lines of work which it is authorized to undertake. He was very friendly to the United States; he established the Catholic University at Washington, and expressed great interest in the Columbian Exposition. Leo was noted for his learning, holiness and statesman-like qualities.

Leoninster, *lem'in stur*, MASS., a town in Worcester co., 5 mi. s. e. of Fitchburg, on the Nashua River and on the New York, New Haven & Hartford railroad. The principal manufactures are piano cases, baby carriages, notions, toys, furniture, paper, cement and brick. The place was settled in 1725 and remained a part of Lancaster until 1740. Population in 1905, including several villages, 14,297.

Leon, *la one'*, a town of Nicaragua, on a large and fertile plain 13 mi. from the Pacific coast. It is regularly built, and the public buildings, which are considered among the finest in Central America, include a massive cathedral, an old episcopal palace, a new episcopal palace and several churches. A railway connects it with the coast at Corinto. The town has suffered much from the civil wars. Population, about 34,000.

Leon or **Leon de los Aldamas**, *la one' daylose al dah'mas*, a town of Mexico, in the State of Guanajuato, on a fertile plain, more than 6000 feet above sea level. It is a well-built place, with flourishing industries of various kinds, which its railway connections have helped to develop. Its chief manufactures are leather, saddlery, cottons and woollens. Population in 1900, 32,623.

Leonardo da Vinci, *la o nahr'do da veen'che*. See VINCI, LEONARDO DA.

Leonidas, a king of Sparta, who ascended the throne in 491 B. C. When Xerxes invaded Greece, the Greek congress assigned to Leonidas the command of the force destined to defend the pass of Thermopylae. His force, according to Herodotus, amounted to over six thousand men, of whom three hundred were Spartans.

Leopard

After the Persians had made several vain attempts to force the pass, a Greek named Ephialtes betrayed to them a mountain path, by which Leonidas was assailed from the rear, and he and his followers fell fighting (480 B. C.).

Leopard, *lep'urd*, one of the largest animals of the cat family, next in size to the lion and the tiger. It is found in Africa, Persia, India, some parts of China and some of the East India Islands. The color varies from a pale fawn to a deep buff, which fades into white on the under side of the body and the inner parts of the limbs. The coat is thickly marked with black or deep brown spots. The leopard is a beautiful and graceful animal. It frequents the forests and feeds upon antelopes, monkeys, sheep, goats and other animals, but seldom attacks man. It is considered more treacherous than the lion or the tiger, and while it is easily subdued when in captivity, great risk and danger attend hunting it. One variety is nearly black and is more fierce than the common leopard. The *cheta*, or *hunting leopard*, is found in northern India.

Le'opold I (1790-1865), king of the Belgians, son of the duke of Saxe-Coburg. In 1816 he married the Princess Charlotte, heir apparent of Great Britain, who died in the following year. In 1831 he accepted the crown of Belgium, which was offered him by a national congress. He gave to Belgium a wise and moderate rule. His second wife was a daughter of Louis Philippe.

Leopold II, **LOUIS PHILIPPE MARIE VICTOR** (1835-1909), king of the Belgians, eldest son of Leopold I, came to the throne in 1865. The organization of the African International Association was his work, and he assisted Stanley with money in his exploration of the Kongo. When the Kongo Free State was established in 1885, Leopold was made its sovereign.

Lepanto, *le pah'n'to*, or **Naupaktos**, a seaport town of Greece, in the nomarchy of Acarnania and Aetolia, on the Gulf of Corinth, or Lepanto. Its harbor is now silted up, but it was anciently of considerable importance. It is

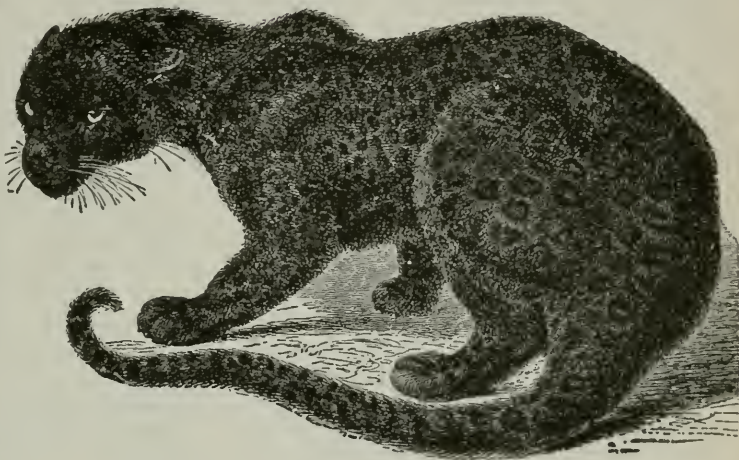
Leprosy

memorable for the naval battle, from which dated the decline of the Turkish power in Europe, fought within the gulf on October 7, 1571, between the Ottoman fleet and the combined fleets of the Christian states of the Mediterranean, under Don John of Austria. The Turkish fleet was destroyed.

Lepanto, **GULF OF**. See CORINTH, GULF OF.

Lep'er. See LEPROSY.

Lepid'olite, a kind of mica, occurring in



BLACK LEOPARD

oblique, rhombic or hexagonal prisms, or in masses composed of small crystalline scales. Its color is pink or peach-blossom, passing into gray and having a pearly luster. It is easily split into thin, translucent, flexible scales, or plates. The mineral is one of the principal sources of the metal lithium.

Lep'idop'tera. See INSECTS.

Lep'idus, **MARCUS AEMILIUS** (?-13 B. C.), a Roman triumvir. He was praetor in 49 B. C., consul with Julius Caesar three years later and in 44 was appointed by Caesar to the government of Nearer Spain. He was in Rome at the time of Caesar's death and joined Mark Antony. In 43 he united with Antony and Octavianus to form the second triumvirate, obtaining Spain in the division of the Empire. After the Battle of Philippi (42) a revision took place, in which Lepidus received Africa. In 36 he was summoned to assist Augustus against Sextus Pompey. He then tried to seize Sicily, but was overcome by Augustus, who deprived him of his triumvirate and banished him.

Lep'rosy, a name applied at different times to several different skin diseases, all of which are

characterized by roughness and scalliness. True leprosy is the *elephantiasis* of the Greeks, the *lepra* of the Arabs, and the *great disease* of the early English. There are several well-marked types of the disease. In the first, tubercles form in the skin, particularly around the eyebrows, where they destroy the hair and after a time form ulcers, which may cause extensive deformity. Sometimes the tubercles form in the nostrils or throat and alter the voice. In the second type, the chief features are insensibility and numbness of the skin, with pains, sleeplessness and restlessness. A third variety is much more violent and often causes a complete destruction of the tissues, even of the bones. All these varieties begin with the appearance of dull or copper-tinted blotches on the skin. When the redness disappears, a stain or white blotch is left. It is now believed that the disease is caused by a bacillus and is contagious, though it is not nearly so widespread in its prevalence as at former times. It is found in Norway and Iceland and in warmer regions generally. From a very early time lepers were separated from the people or often driven into desert and waste regions, where they lived entirely away from other human beings. Even more severe measures were taken against them in some countries, where they might be allowed to come among the healthy, but were compelled to be so clothed as to be recognized at sight and were forced to carry rattles with which to warn others of their approach.

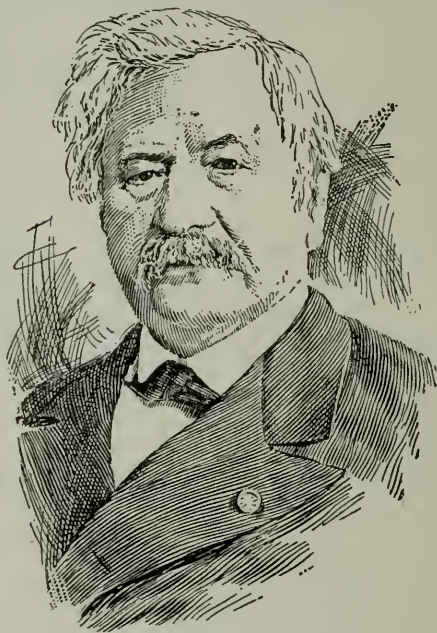
In the United States, Louisiana has a hospital for lepers, in which there are probably less than a hundred now congregated. There are many lepers in the Hawaiian Islands. The care of them has become a burden upon the government. Most of them are confined in a leper settlement on Molokai, where they number about 1300. Here they are allowed to receive visitors, who may, however, not touch them, and from whom they are separated by wire fencing.

Lesage, *le sazh'*, ALAIN RENÉ (1668-1747), a French novelist and dramatic writer. His first attempts were in imitation of the Spanish drama, but his first success was with his *Crispin, his Master's Rival*. *The Devil on Two Sticks*, imitated from a Spanish romance, appeared the same year. In 1715 he published the first two volumes of *Gil Blas*, one of the best romances in the French language, the third volume appearing in 1724, the fourth in 1735. Among his other works are *Turcaret*, his best comedy; *The Adventures of Guzman d'Alfarache*, *The Adven-*

tures of M. de Beauchesne and *The Bachelor of Salamanca*.

Lesbos, *lez'bos*, a Greek island situated off the northwest coast of Asia Minor, often called Mytilene, from its capital. In shape it is nearly triangular, and it has an area of 675 square miles. It is mountainous, but is exceedingly fertile, its principal products being figs, grapes, olive oil and pine timber. The island has belonged to Turkey since the sixteenth century.

Les'seps, FERDINAND, Vicomte de (1805-1894), a French diplomatist and engineer. After



FERDINAND DE LESSEPS

holding several consular and diplomatic posts he retired from the government service, and in 1854 went to Egypt and proposed to the viceroy the cutting of a canal across the Isthmus of Suez. This great work was successfully completed in 1869, under his supervision, and brought him high honors of various kinds. He subsequently proposed several other grand schemes; but the only one really taken in hand was the Panama Canal, which, under French management, proved an unfortunate venture. See PANAMA CANAL.

Lesser Antilles, *an til'leez*. See ANTILLES.

Les'sing, GOTTHOLD EPHRAIM (1729-1781), a German critic, dramatist and scholar. He entered the University of Leipzig in 1746 to study theology, but his love of the drama and his intimacy with Schlegel and other young men

of literary tastes, led him to abandon this intention. In 1755 appeared *Miss Sara Sampson*, a tragedy dealing with the family relation, which had a great effect on German drama. In 1760 Lessing became secretary to General Tauenzien in Breslau for five years, and while there he worked on *Minna von Barnhelm*, the greatest drama produced up to that time in Germany, and *Laokoon, or on the Limits of Painting and Poetry*. About 1767 he became director of the National Theater at Hamburg. While here he wrote his *Dramaturgie*, essays on dramatic art. In 1775 he accompanied Prince Leopold of Brunswick to Italy, and on his return he married. His wife died in little more than a year. At this period he was involved in fierce theological disputes, which his philosophical drama, *Nathan der Weise*, did nothing to allay.

Lethe (from a Greek word meaning *forgetfulness*), one of the streams of the lower regions, celebrated in ancient mythology. Its water had the power of making those who drank of it forget the whole of their former existence. Souls before passing into Elysium drank to forget their earthly sorrows; souls returning to the upper world drank to forget the pleasures of Elysium.

Letters. From very early times the writing of letters has been an important means of communication, and often it has served a much wider purpose than this, as in many instances correspondence which has been preserved has furnished to later ages valuable information regarding the times of the writer. In early times in Greece, correspondence as far as is known was largely between the philosophers and their pupils. Among the Romans, letter writing was more widespread, and certain collections of letters, especially those of Cicero to Atticus, constitute documents of great historical importance. Seneca's letters and those of the Younger Pliny are other notable collections. It was the Romans who first developed the poetical epistle, which was usually a satirical account of private or public affairs. Horace was especially adept in this style of writing. In later centuries Dante, Petrarch, Melancthon and Erasmus wrote letters which have been preserved and which are valuable records of the times.

With increased facility for communication came, of course, corresponding increase in the number of letters which passed between friends. Letters came to be no longer dissertations on public affairs only, but accounts of the real lives of real men and women. Swift's letters to Stella,

as well as those of Arbuthnot, Bolingbroke and Pope, present an almost complete autobiography of the writer. Lady Mary Wortley Montagu's letters are among the most famous which have ever been written by a woman. Chesterfield's letters to his son and Walpole's, Gray's and Cowper's letters are examples of different styles of letter writing, but all show the perfection to which this art may be brought. In the nineteenth century George Eliot, Byron, Lamb, Keats, Scott, Macaulay, Emerson, Carlyle, Mrs. Carlyle, Thackeray, Dickens, Matthew Arnold, Stevenson—in fact, almost all of the famous men and women of literature—left collections of letters which throw most interesting light on their lives and works.

The French have always excelled in letter writing, and perhaps the most famous letter writer of modern times is Madame de Sévigné, whose letters to her married daughter present an excellent picture of Parisian life.

Lettres de Cachet, *let r' de kash shay'*, (French, "letters of seal"). During the four centuries before the outbreak of the French Revolution, it was common for the king or any of his ministers, if they wished to get rid of some person without going through the ordinary forms of law, to order the arrest of such a person and to dispense with the countersigning of the order by a minister, with the registering of the letter by the parlement and with the signature of the great seal of state. Such orders, written on ordinary paper, signed by the king and by one of the secretaries of state and sealed with the king's little seal, were known as *lettres de cachet*. From the accession of Louis XIV the issue of such orders increased in frequency, and often a man might be arrested, thrown into the Bastille and left there, either wilfully or carelessly, until he died, without even being informed as to the nature of his offense. The abolition of these *lettres de cachet* was one of the first things demanded at the outbreak of the revolution in 1789.

Letts, a branch of the Aryan family, belonging to the Letto-Lithuanian group. These people live in the Russian provinces of Courland, Livonia, Vitebsk, Kovno, Pskov and in East Prussia. They are closely related to the Lithuanians, whom they resemble in appearance. They number about 1,350,000 and are mostly Protestants.

Lettuce, *let'tis*, a common little garden plant, of the Compositae, much used as a salad. When allowed to fruit, it produces a stem which grows

to a height of about two feet and bears small, pale yellow flowers. In cultivation the young plant only is eaten, as it becomes bitter and even somewhat poisonous when old. Several different species are recognized, and from one garden variety is produced a form that grows in a head much like a small cabbage. From the sap of one species a drug is obtained that resembles opium in its effects.

Leuctra, *luk'trah*, a village in Boeotia, famous for the victory of the Theban Epaminondas over the Spartans, which put an end to the Spartan domination in Greece (371 B. C.). See EPAMINONDAS.

Leutze, *loit'se*, EMANUEL (1816-1868), a German-American painter, born in Gemünd, Württemberg. At an early age he came with his parents to Philadelphia, where his first instruction in art was received. Later he went to Düsseldorf to study with Lessing. The finest of his productions is a series of pictures of the Revolution, among which is *Washington Crossing the Delaware*. His subjects, more than the quality of his drawings, have made him famous. Other works are *Columbus in Chains*, *Columbus Before the Queen*, *Cromwell and His Daughter*, *Washington at Monmouth*, *News from Lexington* and *Westward Ho*.

Levant', a term applied in the widest sense to all the regions eastward from Italy as far as the Euphrates and the Nile, and in a more restricted sense to the Asiatic coasts of the Mediterranean and the adjacent countries of Asia Minor.

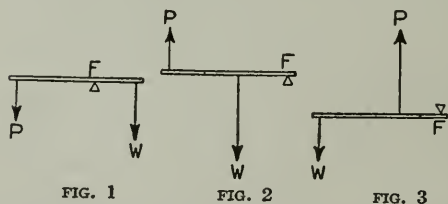
Lev'ee, in engineering, an artificial embankment constructed on the banks of a river for the purpose of keeping the waters in the natural channel during floods. According to this definition the dikes of Holland and the embankments along a number of European rivers, such as the Danube, Po and Vistula, are levees. In the United States, however, the term is applied particularly to the artificial embankments along the Mississippi River, which aggregate more than 1200 miles in length and are constructed along the river at various places from Cairo to the Gulf of Mexico. See MISSISSIPPI RIVER.

Lev'el, an instrument used to find, or draw, a straight line parallel to the plane of the horizon, by this means to determine the true level or the difference of ascent or descent between several places. There is a great variety of instruments for this purpose, differently constructed and of different materials, according to the particular purposes to which they are applied,

as carpenter's level, mason's level, gunner's level, balance level, water level, mercurial level, spirit level and surveying level. All such instruments, however, may be reduced to three classes: (1) Those in which the vertical line is determined by a suspended plumb line, or balance weight, and the horizontal indicated by a line perpendicular to it. Such are the carpenter's and mason's levels. (2) Those which determine a horizontal line by the surface of a fluid at rest, as water and mercurial levels. (3) Those which point out the direction of a horizontal line by a bubble of air floating in a fluid contained in a glass tube. When the air bubble rests directly under the middle point of the tube, the instrument is level. Such are spirit levels, which are by far the most convenient and accurate. All levels depend on the same principle, namely, the action of gravity.

Lever, *le'vur* or *lev'ur*, a bar moving about a point called the *fulcrum* (*F*). The force used to move the lever is called the *power* (*P*), and the object to be lifted, the *weight* (*W*). The parts of the lever on each side of the fulcrum are called the *arms*. The power arm is the part between the fulcrum and the point where the power is applied; the weight arm is that part between the fulcrum and the weight. There are three classes of levers, distinguished by the different applications of the fulcrum, power and weight.

The lever of the first class has the fulcrum between the power and the weight, as shown in Fig. 1. *F* represents the fulcrum, *P* the



power and *W* the weight. A common crowbar, a pump handle and a pair of scissors are good illustrations of levers of the first class.

The lever of the second class has the weight between the power and the fulcrum, as shown in Fig. 2. An oar, a nutcracker and a wheelbarrow are good illustrations of this class of levers.

The lever of the third class has the power between the weight and the fulcrum, as shown in Fig. 3. Good illustrations of the third class lever are the treadle of a sewing machine and the forearm.

A lever is said to be in *equilibrium* when the power and the weight balance each other. The law of equilibrium is that the power multiplied by the length of the power arm is equal to the weight multiplied by the length of the weight arm. In a lever of the first class which is three feet long and has a fulcrum one foot from one end, a power of one pound would balance a weight of two pounds. In levers of the third class the positions of the power and weight are reversed. By levers of the first and second classes we gain power and lose speed; by those of the third class we lose power and gain speed.

Compound levers consist of a number of levers so arranged that the power arm of one acts upon the weight arm of the other. Their effect is to increase the power of the lever. They are illustrated by the hay scale, in which the weight of the hand may balance a load of hay. See **WEIGHING SCALE**.

Lev'er, CHARLES JAMES (1806-1872), an Irish novelist. He was born in Dublin and educated at Trinity College. In March, 1834, he contributed his first paper to the newly started *Dublin University Magazine*, and the first chapter of *Harry Lorrequer* appeared in that magazine in 1837. Among his later novels are *Charles O'Malley*, *Tom Burke of Ours*, *Jack Hinton*, *Arthur O'Leary* and *Roland Cashel*. The lively humor which is considered characteristic of Lever is more in evidence in his early than in his later writings. For the last thirty years of his life Lever was in the diplomatic service, first at Florence, later at Spezia and finally at Trieste.

Lev'erwood. See **HORNBEAM**.

Levi'athan (a long-jointed monster), the name applied in *Job* xli and elsewhere in the Scriptures to an aquatic animal variously held to be the crocodile, the whale or some species of serpent.

Levis, *le vee'*, or **Point Levi**, capital of Levis co., Quebec, Canada, on the Saint Lawrence River, opposite Quebec. It is on the Intercolonial, the Quebec Central and the Grand Trunk railways and is connected with Quebec by ferry and by a cantilever bridge, the largest of its kind in the world. Steamships arriving from Europe land their passengers at Levis. It has machine shops, an iron foundry, boot and shoe, cigar, soap, woolen and other factories and lumber mills. The first settlement was made in 1647, and it became a city in 1861. Population in 1901, 7783. See **QUEBEC**.

Le'vites, the name generally employed to designate not the whole Jewish tribe that traced

its descent from Levi, but a division within the tribe itself, in contradistinction to the priests, who are otherwise called the "sons of Aaron." They were the ministers of worship, especially singled out for the service of the Temple, and with the priests formed the priestly tribe. A permanent arrangement was made for their maintenance. In place of territorial possessions they were to receive tithes of the produce of the land, and in their turn to offer a tithe to the priests. After the settlement in Canaan, forty-eight cities, six of which were cities of refuge, were assigned to the tribe of Levi, thirteen of the total number being set apart for the priests. To the Levites was to belong the office of preserving, transcribing and interpreting the law, and they were to read it every seventh year at the Feast of Tabernacles. Their position was much changed by the revolt of the ten tribes, and they are seldom mentioned in the New Testament, where they appear as the types of formal, heartless worship.

Levit'icus, the name of the third book of the Old Testament, so called from the first word of its contents. By the later Jews it was called the *Law of the Priests* and sometimes the *Law of Offerings*. It consists of seven principal sections, but may be generally described as containing the laws and ordinances relating to Levites, priests and sacrifices.

Lewes, *lu'is*, GEORGE HENRY (1817-1878), a philosophical writer and contributor to most departments of literature, born in London. He was educated in England and Germany, where he gave special attention to philosophy. He then began to write for magazines, becoming literary editor of the *Leader*, which position he held for five years. He made an exhaustive study of physiology, for the purpose of using the knowledge gained in the solution of philosophical problems. In 1854 he became the common-law husband of Marian Evans (George Eliot). In 1865 he founded the *Fortnightly Review*. His best-known works are *Biographical History of Philosophy from Thales to Comte*, *Comte's Philosophy of the Sciences*, *Life and Works of Goethe*, *Physiology of Common Life* and *Problems of Life and Mind*.

Lew'is, MERIWETHER (1774-1809), an American explorer, born near Charlottesville, Va. He fought in the United States army during the Whisky Rebellion in 1794 and later became an ensign and captain in the army. In 1801, President Jefferson appointed him his private secretary, and two years later he was chosen to

lead an expedition for the purpose of exploring the territory recently acquired from France (See LEWIS AND CLARK EXPEDITION). As a reward for his service in this expedition, Congress voted him 1500 acres of land, and he was appointed governor of Louisiana Territory in 1807. He displayed energy and ability in administration and during his incumbency prepared for publication a valuable account of his journey.

Lewis and Clark Expedition, an expedition commanded by Meriwether Lewis and William Clark, whose purpose was to explore the territory between the Mississippi River and the Pacific Ocean. The party left Saint Louis, Mo., May 14, 1804, ascended the Missouri River, wintered among the Mandan indians in North Dakota, again set out in April, 1805, crossed the Rocky Mountains in September and came in sight of the Pacific Ocean, November 7. They started on their return in the following March and arrived at Saint Louis, September 23, after a journey of 8500 miles. The trip resulted in the collection of a great mass of exceedingly valuable information concerning the geography, climate, natural products and animal life of the region explored. See LEWIS, MERIWETHER; CLARK, WILLIAM.

Lewis and Clark Exposition, an industrial exposition held at Portland, Ore., in the summer of 1905, to commemorate the one hundredth anniversary of the journey of Meriwether Lewis and William Clark from the Mississippi River to the Pacific coast. The exposition buildings, of which there were eleven main structures, were artistically grouped on a beautiful sloping greensward, facing two attractive bodies of water, which made possible the development of landscape and architectural scenes of rare beauty. The exhibition covered about 406 acres. Its total cost to its promoters was about \$7,500,000; to the states that had special exhibits, \$1,000,000, and to the Federal government, \$500,000.

Lewis River. See SNAKE RIVER.

Lewiston, IDAHO, the county-seat of Nez Perces co., about 145 mi. s. by e. of Spokane, Wash., at the junction of the Clearwater and Snake rivers and on the Northern Pacific railroad. The city is in a rich farming, fruit-growing, stock-raising and mining district, has a considerable trade and is growing very rapidly. The most important industrial establishments are flour and lumber mills. The city is the seat of the state normal school and of several private

academies. A splendid steel bridge connects the place with Clarkston, on the opposite side of the Snake River. Population in 1900, 2424, and in 1905, 5354.

Lewiston, MAINE, a city in Androscoggin co., 35 mi. n. of Portland, on the Androscoggin River, opposite Auburn, and on the Grand Trunk and the Maine Central railroads. It has many factories, of which the most important are cotton and woolen mills. There are also extensive bleaching and dye works and manufactures of boots and shoes, lumber, machinery and various products. Bates College, which includes the Cobb Divinity School, is located here, and the city has a fine public park, a city hall, a Carnegie library, two hospitals, two convents and a number of fine church and school buildings. The place was settled in the early part of the seventeenth century and was incorporated as a town in 1795. It was chartered as a city in 1863. Population in 1900, 23,761.

Lexington, KY., the county-seat of Fayette co., 98 mi. s. of Cincinnati, Ohio, on the Chesapeake & Ohio, the Louisville & Nashville, the Southern and other railroads. The city is in the famous "blue grass region" and is the chief market for the products of that section. The principal manufactures are bourbon whisky, saddlery, flour, canned goods, lumber and wagons. In 1905 natural gas was brought to Lexington through a pipe line from Menifee County. This has given an impetus to manufacturing by offering cheap fuel. Lexington has a good public library and is an important educational center, being the seat of Kentucky University, Sayre Female Institute, Hamilton and Campbell-Hagerman female colleges, Saint Catherine's Academy, the state agricultural and mechanical college and the Kentucky reform school. The charitable institutions are the state asylum for the insane, Saint Joseph's Hospital, an industrial home for negroes and the Good Samaritan Hospital. Henry Clay had his home in Lexington for many years. The first settlement was made in 1779 by hunters. In 1782 the town was incorporated, and when Kentucky became independent it was made the capital. Population in 1900, 26,369.

Lexington, Mo., a city and the county-seat of Lafayette co., 40 mi. e. of Kansas City, on the Atchison, Topeka & Santa Fé and the Missouri Pacific railroads. The city is situated on the Missouri River and is in the center of the hemp-growing region. It contains the Wentworth Military Academy, Central Female College and

Lexington

Baptist Female College. To the northeast of the city is a hill which is interesting from a historical point of view, being the place where 3000 Union soldiers under Colonel James Mulligan sustained a siege against 18,000 Confederates under General Sterling Price. They were at last compelled to surrender. Lexington was settled in 1825 and was incorporated in 1830. Population in 1900, 4190.

Lexington, BATTLE OF, the first battle of the Revolutionary War, fought at Lexington, Middlesex County, Mass., April 18, 1775. A British force of 800 soldiers had been dispatched by General Gage to seize the stores which had been collected at Concord by the colonists and to capture Samuel Adams and John Hancock, who were said to be in hiding at Lexington. News of the expedition was carried through the country by Paul Revere, who rode from Charlestown to Lexington. When the soldiers reached the latter point, they were confronted on the Common by about 70 militiamen. The British commander, Pitcairn, demanded that the company disperse, and some one, minuteman or grenadier, fired a shot. A brief skirmish ensued, in which eight militiamen were killed and ten wounded. At Concord the British found the stores removed and encountered another force of about 400 militiamen, who forced them to make a rapid retreat towards Boston. On the route they were constantly harassed by bands of farmers who fired upon the British columns from behind rocks and trees. The loss to the British was 273 men.

The village of Lexington is 11 mi. n. w. of Boston, on the Boston & Maine railroad. Its population in 1900 was 3831.

Leyden or **Leiden**, *li'den*, a city of the Netherlands, 22 mi. s. w. of Amsterdam. The most important educational institution is the university, formerly one of the most famed in Europe. It is attended on the average by about 900 students, nearly one-half studying law. Leyden has cloth and other manufactures, although it is no longer famous for its textiles, as it was during the fifteenth century. The historical event for which Leyden is most famous is the siege by the Spaniards in 1573-1574 and the relief by the prince of Orange, who had the dikes opened and the country flooded. The Pilgrims started from Leyden to found the colony at Plymouth, Mass. Population in 1902, 54,857.

Leyden Jar, an early form of electric accumulator, introduced to the scientific world by

Libby Prison

Muschenbroek of Leyden in 1746; hence its name. It consists of a glass jar, coated inside and outside, usually with tin foil, to within a third of the top. The mouth is closed by a wooden cover. A metallic rod, with a knob at the top, is fixed into the cover and is made to communicate with the inside coating; when the jar is to be charged the knob of this rod is applied to the prime conductor of an electric machine and the two coatings are brought into opposite electrical states, the inside being positive and the outside negative. The jar is discharged by establishing a communication between the outside coating and the knob. When a number of jars are placed in a box lined with tin foil connected with the earth, their knobs being joined together, they form a *battery*. A quantity of electricity equal to the sum of the charges which would be received by each jar can be collected in such a battery, capable of melting fine metallic wires, puncturing plates of glass or cardboard, killing animals and rupturing bad conductors. See **ELECTRICITY**.

Lhasa or **Lassa**, *lah'sah*, the capital of Tibet, situated on the Kyi-ch'u, a tributary of the Brahmaputra. All the public edifices worthy of notice are connected with the Buddhist religion, as Lhasa is a great center of Buddhism and is visited by thousands of pilgrims from China, Turkestan and Nepal. Lhasa is the principal emporium of Tibet, silk stuffs, tea and other articles being here exchanged for Tibetan, Indian and European goods. Late in the eighteenth century a law was established that no foreigner should enter the city, but it was entered by British forces under Colonel Young-husband in 1905. Population, about 10,000.

Lia'nas, a name common to any of those twining and climbing plants which grow in great profusion in the hot, moist climate of the tropics. Here in many cases the lianas overtop the highest trees and make an impenetrable network of an entire forest by their cable-like stems.

Libau, *le'bow*, an important seaport of Russia, in the Province of Courland, between Lake Libau and the Baltic Sea. Its trade in corn, flax, hemp and other products is considerable. Population, 64,500.

Lib'by Prison, a military prison in Richmond, Va., used by the Confederacy during the Civil War. It was originally a tobacco warehouse, was first used as a prison after the first Battle of Bull Run and was constantly in service from that time until the end of the war. At times there were twelve hundred prisoners in the build-

ing, and their crowded condition caused much suffering. Many attempts to escape were made by prisoners, and in February, 1864, more than one hundred prisoners escaped through a tunnel which had been excavated by some of their number. About sixty of these reached the Federal lines, but the remainder were recaptured. The building was taken down in 1888, carried to Chicago and there rebuilt, brick by brick, being opened in the following year as a war museum. It was later demolished.

Li'bel, in law, the act of publishing malicious statements with the intent to expose persons or institutions to public hatred, contempt or ridicule. The difference between libel and slander is that in the former case the defamation must have been in writing, printing or in some other visible manner, while in the latter the offense is committed verbally. Publication is held to have taken place if the libel is seen but by one person other than the person libeled. In criminal law it is a misdemeanor to publish, or threaten to publish, a libel; or as a means of extortion, to offer to abstain from or to prevent others from publishing a libel. In the United States the punishment for this offense is imprisonment, fixed by statute in the different states. If the charges contained in the libel are true, a civil action cannot be maintained, though the defendant may still be held for a criminal offense. In a civil action the plaintiff recovers damages, the amount of which is settled by the jury. Recent legislation and decisions in this branch of law in Great Britain and the United States have a tendency to limit liability for action to purely false, scandalous and malicious libels. Truth, if published with good motives and for justifiable ends, is now admitted as a good defense; and even an innocent motive alone is so considered, though the statements may prove untrue.

Lib'eral, in politics, one who claims to represent the principles of freedom, reform and progress. The main objects of liberal agitation and legislation are to extend the principles of democracy. Most European countries have powerful liberal parties, and liberalism is rapidly spreading, particularly in Great Britain, Germany, Italy, Spain, Holland, Norway and Sweden. In Great Britain, the Liberal party is the lineal descendant of the Whigs and stands for economy and constitutional reform. It is strongest in Scotland and Wales and is almost always in a minority in England. The greatest of modern Liberal leaders was W. E. Gladstone, but his introduction, in 1886, of the Irish Home Rule

and Land Purchase bills alienated some of his most able supporters and led to the formation of the Liberal Unionist Party. The Liberals, led by Campbell-Bannerman, won a sweeping victory in England in 1906, on the principle of the maintenance of free trade. The Radicals consist of a branch of the Liberals, who demand more sweeping reforms than others of their party. The party opposed to the Liberals is the Conservative party.

Liberal Repub'lican Party, the name given to a coalition of political factions during the presidential campaign of 1872. It was organized by Missouri Republicans under Carl Schurz and B. Gratz Brown, as a protest against the reconstruction policy of Congress and in favor of tariff reform and civil service reform. The national convention was held in January, 1872, at which Horace Greeley was nominated for president and B. Gratz Brown for vice-president, the issues being the same as in Missouri, with the omission of the tariff question. The Democratic convention accepted the Liberal Republican candidates; but a small Democratic element made independent nominations. After a campaign remarkable for its bitterness and for the widespread interest it aroused, Greeley was overwhelmingly defeated, and the party did not reappear in politics.

Liberal Unionist Party, in British politics, a party formed in the summer of 1886 by Liberals (under the leadership of the marquis of Hartington), who objected to Mr. Gladstone's Irish Home Rule and Land Purchase bills, as being destructive of the integrity of the United Kingdom and dangerous to the Empire. They gained their immediate object by coalescing with the Conservatives, and in the election which followed the defeat of the Gladstonian ministry they succeeded in returning some 80 members to Parliament. They have since acted with the Conservatives.

Libe'ria, a negro republic on the west coast of Africa, founded in 1822 by liberated American slaves, under the auspices of the American Colonization Society, and recognized as an independent state in 1847. The area is about 35,000 square miles, or a little less than that of Indiana. The soil is fertile, well watered and highly adapted to the cultivation of all tropical products. The chief crop is coffee, increasing quantities of which are grown from year to year and exported, other exports being palm oil, groundnuts, caoutchouc and ivory. The constitution of the Republic is modeled after that of

the United States. The capital is Monrovia. The population is estimated at between 1,000,000 and 2,000,000, of which perhaps 20,000 are civilized negroes.

Liberty, **STATUE OF**, a huge bronze statue on Bedloe's Island, in New York harbor. It was presented to the United States by the people of France and was intended as a commemoration of the one hundredth anniversary of American independence. It was placed on the island in 1885 and was dedicated in the following year. The Statue of Liberty is the largest statue in the world and represents a female figure with a torch. From the base to the top of the torch the statue is 151.41 feet high. A stairway in the inside of the statue leads to the head, and there is a branch stairway within the extended arm. The complete name, given it by its donors, is "Liberty Enlightening the World."

Liberty Bell, the bell which hung originally in Independence Hall, Philadelphia, and which first pealed forth the news of the signing of the Declaration of Independence. It was cast in England in 1752, and bears the inscription: *Proclaim liberty throughout all the land unto all the inhabitants thereof* (Lev. xxv, 10). It was cracked at its first ringing, was recast in 1753 and was again cracked while tolling on the funeral day of John Marshall, July 8, 1835. It is on exhibition at Independence Hall, Philadelphia, but has been shown at several recent expositions.

Liberty Party, a political party organized in the Northern states of the Union about 1839, its purpose being to oppose slavery by means of political action. Its formation in reality voiced a protest against the non-resistant and non-participant attitude of Garrison and his radical followers. James G. Birney was the first candidate of the party for president, being originally nominated at a small local convention in New York State and afterward endorsed by a so-called national convention at Albany, N. Y. The ticket polled only about 7000 votes, more than one-third of which were cast in New York State. In 1844 a more representative convention assembled and again nominated Birney for president. In this election the Liberty party polled 62,000 votes. Moreover, by drawing many votes from the Whig party in New York, it defeated Clay and elected James K. Polk. Its last candidate was John P. Hale, who, however, withdrew after Van Buren's nomination by the Free-Soil party in 1848. Thereafter it was practically absorbed by the latter party.

Li'bra (the balance, or scales), the seventh sign of the zodiac, into which the sun enters about September 23, the time of the autumnal equinox. In ancient astrology the symbol (♎) represented a pair of scales.

Li'brary, the name given to a collection of books and to the building in which it is located. Libraries existed in ancient Egypt and Assyria, and Pisistratus is said to have established a free public library at Athens in the fifth century B. C. Cicero and various wealthy Romans made collections of books, and several Roman emperors established libraries, partly with books obtained as spoils of war. In the fourth century A. D. there were twenty-eight public libraries in Rome, besides many private collections, the librarians of which were slaves or freedmen. The barbarian invasions destroyed all these libraries. The most celebrated library of antiquity was the Alexandrian (See ALEXANDRIAN LIBRARY).

Through the Middle Ages the chief libraries were those of the monasteries. Every Benedictine house had its collection of books and its corps of copyists. Many of the famous libraries of modern Europe originated in these monastery collections. The universities of the fourteenth century found libraries indispensable; and by the middle of the fifteenth, public city libraries were in existence. The invention of printing gave a great impetus to the collecting of books, as copying manuscripts by hand had made them exceedingly expensive.

The principal libraries of modern times are the National Library at Paris, the largest in the world, with about 3,500,000 books and over 100,000 manuscripts; the British Museum Library, London, with more than 2,000,000 books and 100,000 manuscripts, and the Imperial Library at Saint Petersburg, with over 1,500,000 volumes and 33,000 manuscripts. The Royal Court Library at Munich, the Library of Congress at Washington and the Royal Library at Berlin have each over 1,250,000 volumes and thousands of manuscripts. Other great libraries are the Imperial Library at Vienna; the royal libraries at Copenhagen, Stuttgart, The Hague and Brussels; the university libraries of Oxford, Cambridge, Paris, Göttingen, Leipzig and Heidelberg, and the libraries of Moscow, Madrid, Florence and Edinburgh. The Vatican Library, Rome, and the Bodleian, at Oxford, are particularly rich in rare books and manuscripts. The spread of education has called into existence innumerable smaller libraries, general in scope, or institutional, with books

Library

selected for special classes of readers. Naturally the widest provision for such libraries is found in countries having the best educational systems, as the United States, France, Germany and Great Britain.

Harvard College, founded in 1636, really started from the gift of John Harvard's library in 1638; Yale began in 1700 with a library; nineteen other college libraries were founded in the colonies before 1800, when the largest library in the United States, that of the Library Company of Philadelphia, contained only 15,549 volumes. Now there is a free library in almost every town; there are great libraries in the larger universities, libraries in the colleges, in many schools and in clubs. According to the reports of the bureau of education, there are in the United States nearly 6000 libraries which have 1000 or more volumes each. Massachusetts has a free lending library in every town, and the Public Library of Boston, long the first, is now the second largest free circulating library in the world (See BOSTON, subhead *Buildings*). The following table gives the largest United States libraries, with their number of volumes according to the latest available statistics of 1905 or 1906:

Library of Congress.....	1,344,618
New York Public Library.....	1,229,383
Boston Public Library.....	871,050
Harvard University Library.....	700,342
Brooklyn Public Library.....	476,969
Yale University Library.....	475,000
University of Chicago Library.....	447,166
New York State Library.....	413,288
Columbia University Library.....	388,080
Chicago Public Library.....	324,082
Cornell University Library.....	311,897
Princeton University Library.....	291,032
Enoch Pratt Free Library of Baltimore.....	285,502
Newberry Library, Chicago.....	267,600
Free Library of Philadelphia.....	265,588
University of Pennsylvania.....	244,856
Mercantile Library, New York City.....	235,947

Increase in the number of libraries has been followed by better facilities for the distribution of books among the people. In cities, through branch libraries and substations, books are supplied from the central library by library wagons. New York has 35 branch libraries; Brooklyn, 27; Boston, 10 branches and 16 delivery stations; Chicago, 6 branches and 68 stations, and Saint Louis, 68 stations. New York state provided for rural districts in its library law of 1835, giving aid equal to the amount raised in each district, and twenty-one other states established school district libraries;

Library of Congress

but this system failed, owing to the small amounts raised in each district. The Illinois statute of 1872 set a new standard, providing library support by taxation, and was followed in many states. Since 1890 twenty-three state library commissions, or their equivalents, have been established, and these in New York and the West reach the rural districts through traveling libraries. The commission selects the books, buys them at the expense of the state and arranges them in small collections in boxes or cases, so constructed that they can be readily transported from place to place. The only expense to those wishing to use them is the cost of transportation. In New York, Wisconsin and Minnesota these traveling libraries have been a remarkable success.

In many cities and towns there are also circulating libraries conducted by private enterprise. The books are owned by some individual or corporation and loaned to patrons at a nominal charge. The most extensive libraries conducted on this plan are the Book-Lovers' Library and the Tabard Inn Library, each of which has stations in nearly every city and town of considerable size in the country.

Library of Congress, a library at Washington, D. C., established by the United States government in 1800. It was destroyed in 1814 at the burning of the capital by the British, but received a new start with the purchase of the library of Thomas Jefferson. It was again partially destroyed in 1851, but since that time it has constantly increased in extent and value, until in 1905 it contained 1,344,618 printed books and pamphlets, besides 500,000 pieces of music, maps, charts, photographs, engravings and manuscripts. It is the largest library on the western hemisphere and one of the finest in the world. It is especially rich in history and political science and in collections of American newspapers. The library is replenished through regular appropriations by Congress, through gifts and exchanges and through the addition of copies of all books copyrighted in the United States. In 1897 the library was removed from the Capitol to a special building begun in 1889 and completed at a cost of \$6,500,000. It stands just east of the Capitol building. Its ground plan is oblong, covering 3½ acres of ground, and is has a floor space of more than 8 acres. The building is of Concord granite on a framework of steel, and the interior walls are encased and decorated wholly with stucco and marble. The vast copper dome terminates 195 feet from the

ground in a gilded torch of learning. The decorations represent the finest work of American artists, more than forty of whom were engaged upon the work at different times. The building is considered to be the finest library building in the world.

License, *li'sens*, in law, the grant of permission to do some act, otherwise unlawful; also the document conferring such authority. All civilized countries require that persons should not carry on certain trades or professions or do certain acts, without previous grant of license, and such licenses are imposed for the sake of regulating traffic and raising revenue. The most common licenses are issued to empower persons to sell such articles as liquors and tobacco, to peddle or to assemble in public meetings. In regard to the sale of liquor, the license question has become of great importance in the United States, as the source of a heated controversy between the *Prohibitionists*, who would forbid the liquor traffic; the advocates of *low license*, who would collect a license as a source of revenue, but not for regulation, and the advocates of *high license*, who would collect the license primarily for regulation of the business and secondarily for revenue. In different states of the Union all of these systems are in use. See PROHIBITION PARTY; LOCAL OPTION.

Lichens, *li'kenz*, a very extensive order of flowerless plants. According to the well-established modern theory, lichens are composed of both algae and fungi, the latter parasitic on the former and yet living with them in a way that seems to be mutually beneficial. The lichens have neither stem nor leaves, but consist mainly of a leaf-like thallus, which derives its nourishment from the air. Probably 4000 species of lichens have already been described, and doubtless more will be found. They are gray, yellow or brown in color, and they sometimes present a beautiful and varied appearance. They are



A LICHEN

found in greatest variety in high mountain regions and in Polar lands, where they are the principal form of vegetation. Some species are widely distributed, being found in almost all parts of the northern hemisphere. Some are valuable articles of food, as the Iceland moss, which grows abundantly in the northern regions, and the so-called reindeer moss, which is the chief article of food for reindeer and other animals during the cold winters. Several dyes and litmus, so extensively used in chemistry, are lichen products. The chief service which the lichens perform in nature is to pave the way for plants of higher orders. They are able to derive their subsistence from the air. Growing as they do upon exposed rocks and in barren soil, they dissolve the rock and soften the soil, and in time, when their decaying bodies mix with the soil, they enrich it so that more highly developed plants can grow there.

Lick, JAMES (1796-1876), an American philanthropist, born in Fredericksburg, Pa. He engaged in the manufacture of pianos and in 1847 settled in California, where he accumulated a large fortune by real estate investments. In 1874 he placed \$3,000,000 in the hands of trustees, for use in the promotion of educational enterprises. Of this, \$540,000 was given for a school of mechanical arts and \$700,000 was granted to the University of California for an observatory, which was to contain the largest telescope in the world at that time. See LICK OBSERVATORY.

Lick Observatory, *ob zurv'a to ry*, an astronomical observatory in California, situated on Mount Hamilton, 4285 feet above sea level, and about 25 miles east of San José. The telescope is the second-largest refracting telescope in the world, the objective having an aperture of 36 inches, being exceeded only by the 40-inch telescope of Yerkes Observatory at Lake Geneva, near Chicago. The point of suspension of the telescope tube is 36 feet from the floor, and the diameter of the dome is 36 feet. The sum of \$700,000, left by James Lick, a San Francisco millionaire, was used for the erection and equipment of this observatory.

Licorice or **Liquorice**, *lik'o ris*, a name for several herbs of the family leguminosae. Though the purplish flowers are large and attractive, the plant is known best for its juice, prepared from the small, yellowish roots and most familiar in the form of a black, gummy substance, sold in sticks or lozenges. A great deal of the licorice sold in the markets is much adulterated with

cheaper materials, and this is especially true of that which comes from Spain.

Lic'tors, in Rome, were the public servants, usually freedmen, who attended upon the chief magistrates—dictators, consuls, praetors and propraeors—to clear the way for them and to



LICORICE

cause due respect to be paid to them. They carried axes tied up in bundles of rods, called *fasces*, as ensigns of office. The number of lictors depended upon the rank of the magistrate, a dictator having twenty-four, a consul twelve, a praetor two and a propraeor six.

Liebig, *le'biK*, JUSTUS, Baron von (1803-1873), one of the most eminent of modern chemists, born at Darmstadt, Germany. Through the favor of Humboldt, he was appointed, in 1825, professor of chemistry at the University of Giessen, a chair he held for twenty-five years. Later he held similar positions at Heidelberg and Munich. He is regarded as the founder of organic chemistry, owing to the many discoveries he made in this department. He did much to improve the methods of analysis; his *Chemistry*

of Food has brought about a more rational mode of cooking and use of food, while agriculture owes much to his application of chemistry to soils and manures.

Liechtenstein, *leeK'ten stine*, an independent state, lying between Austria and Switzerland, bounded on the n. and e. by Vorarlburg, on the s. and w. by the Swiss cantons of Grisons and Saint-Gall. The surface, except in the western part, is covered with mountains, branches of the Rhaetian Alps. The western boundary of Liechtenstein is the Rhine River. The chief industries are agriculture, stock raising, weaving and the production of wines and various wooden articles. Since 1866 the principality has belonged to the Austrian Customs-Union.

Liège, *le ayzh'*, a town of Belgium, capital of the province of same name, 54 mi. s. e. of Brussels. It dates from the sixth century, was once strongly fortified and still has a citadel and another fort. Liège is the principal manufacturing town of Belgium, its foundries and its firearm, metal and tool manufactures being very extensive. There are also important woolen mills, tanneries and printing offices. Population in 1900, 173,706.

Liegnitz, *leeK'nits*, a town of Prussia, in the province of Silesia, on the Katzbach, 40 mi. w. n. w. of Breslau. Among its notable buildings are the ancient royal castle and the churches of Saint Peter and Saint Paul. Its manufactures include machinery and hardware, pianos, gloves, woolens, cottons and linens. Population in 1900, 54,882.

Lien, *leen* or *li'en*, in law, in its most usual acceptation, "the right which one person, in certain cases, possesses of detaining property placed in his possession belonging to another, until some demand of the one possessing the property is satisfied." In the United States liens are of two kinds: (1) *Specific liens*, where the person in possession of goods may detain them until a claim, which accrues to him from those *identical* goods, is satisfied; such are, the lien on baggage, possessed by hotelkeepers or common carriers; on goods sold but remaining in possession of the merchants; of workmen on the product of their labor. (2) *General liens*, where the person in possession may detain the goods, not only for his claim accruing from them, but also for the general balance of his account with the owners.

Lifeboat, a special boat for saving persons from shipwreck. The first lifeboat was patented in Great Britain in 1785, but a very successful

improved form was introduced in 1780 and remained almost the only one in use till 1851. Since that time many improvements have been made, so that now strong and serviceable boats, so constructed that it is almost impossible to upset them, capable of carrying heavy loads and fully prepared for all the emergencies of a shipwreck, are in use at the life-saving stations on the coasts of the great nations. See LIFE-SAVING SERVICE.

Life Buoy, *boi*, a device intended to support persons who have fallen into the water, until assistance can reach them. The common life buoy consists of a ring of canvas, stuffed with cork. The ring is usually about 30 inches in diameter and has one or more loops on the outer rim, to which a life line can be attached. When in use the buoy is placed around the wearer under the arms. It is usually put on over the head and will assist the person to float for a long time. Another common style of life buoy consists of a sort of jacket, made of plates of cork covered with waterproof canvas. This is buckled around the body under the arms and serves the same purpose as the ring buoy. See LIFE-SAVING SERVICE.

Life Insurance, *in shoor'ans*. See INSURANCE.

Life-Saving Gun and Rocket. At nearly every life-saving station is a mortar, loaded with gunpowder and with a projectile with a line attached to it. The missile in one form is armed with curved barbs, something like the flukes of an anchor, which are intended to grapple the rigging or the bulwarks of a ship. The mortars may be discharged with accuracy at a range of from 700 to 1000 yards. A so-called *rocket* is also sometimes used. It is fired in the ordinary way, but in its head is a line that uncoils as the rocket speeds toward its mark. See LIFE-SAVING SERVICE.

Life-Saving Service. In 1871 the United States organized its present life-saving system, and now stations are located at points of danger on the Atlantic coast about five miles apart and at intervals wherever there is most danger on the Pacific coast and along the shores of the Great Lakes. There are now about 275 of these stations, of which about two-thirds are on the coasts of the Atlantic Ocean and the Gulf of Mexico. The buildings are firmly built structures, intended to weather any storm and, if necessary, to withstand the tides. Within are apartments for the life-saving crew and for such persons as may be saved from wrecks. Usually

the crew consists of a keeper and from six to eight men, who are required to be citizens of the United States between eighteen and forty years of age. The keeper is in care of the buildings and has the control of his crew, over whom he exercises rigid discipline and from whom he requires frequent drills, in order that the men may become expert in handling the apparatus. Each station is equipped with boats, which are always in readiness for launching and are equipped with hatchets, bailing buckets, life-preservers and various other appliances that may become necessary. Five or eight oarsmen handle the boat, which will carry from nine to twelve additional persons (See LIFEBOAT). When the lifeboat cannot be used, rockets and guns may be used (See LIFE-SAVING GUN AND ROCKET). When a line has been fastened to the ship in distress, a life buoy or life car can be sent out to the ship and brought back loaded with passengers. The breeches buoy is a circular contrivance from which depend a pair of short canvas breeches. It is so contrived as to be run along a line from the ship to shore, a single passenger being fastened in the buoy (See LIFE BUOY). All day and all night, especially in heavy weather, a strict lookout is kept for vessels in distress, both from the station and by the men who patrol the shore. The work done during a single year is remarkable. Several hundred vessels are warned away from dangerous places by the patrolmen each year, and the number of persons saved runs into the thousands, while the value of property reclaimed is estimated in the millions of dollars. Most of the foreign nations sustain similar organizations.

Lig'ament, in anatomy, a strong, tendinous, inelastic white body which surrounds the joints and connects bones, or which strengthens the attachments of various organs or keeps them together. Every joint is surrounded by a capsular ligament; the tendons at the wrist and ankle are bound down by what are called the annular ligaments. In dislocation of joints the capsular ligament is often broken.

Light, *lite*. Everyday experience tells us that we see objects by the aid of something that comes from them to the eye, and that this agent is thrown off by the sun and other bright objects. We call this agent *light*. Light is supposed to be the result of minute vibrations in a substance or medium called *ether*. Unlike the vibrations that produce heat, those which produce light run crosswise to the direction in which the lines of light travel. They are so minute that their

effect cannot be perceived by any organ except the eye.

WHERE LIGHT COMES FROM. So far as we know, light is given off only by very hot bodies. The sun is the great source of light, as well as of heat. The stars also are sources of light, a small portion of which comes to us. Other sources are chemical and mechanical action. The lights used to light our houses and streets are from one or the other of these sources. Candles, lamps and gas jets give off light by burning. The burning is caused by the union of the oxygen of the air with the carbon in the tallow, oil or gas. This is a form of chemical action. Electric lights are produced by friction, which is a form of mechanical action (See **ELECTRIC LIGHT**). Bodies that give off light are called *luminous*. Luminous bodies give off light equally in all directions.

HOW LIGHT TRAVELS. Light travels through substances of uniform density in straight lines, called *rays*. For this reason we cannot see through a bent tube or around the corner of a house. The velocity of light is so great that for all distances on the earth it is instantaneous. Light travels one hundred eighty-six thousand miles per second. It requires eight minutes and nineteen seconds for light to pass from the sun to the earth, but many of the stars are so far away that it requires a number of years for the light to reach us from some of them.

A substance which allows light to pass through it freely, like glass and water, is *transparent*.

A substance that will not allow light to pass through it, as iron, tin and black cloth, is *opaque*.

A substance which allows some light to pass through it, but not enough to enable us to see objects beyond it, as ground glass, white paper and white cloth, is *translucent*.

The brightness of light varies directly as the brightness of the luminous body and decreases as the square of the distance from the luminous body increases. A lamp having a flame four times as bright as a candle will give four times as much light; an object two feet from a lamp will receive four times as much light as it will when four feet distant.

REFLECTION OF LIGHT. When rays of light strike an object, some of them enter it, or are *absorbed*, and others are thrown back, or *reflected*. It is by the reflected rays that we see objects. A rough surface scatters the reflected rays more than a surface that is highly polished like a mirror. Strange as it may seem, objects that are poor reflectors can be seen more easily

than those that are good reflectors. The reflection of the object which we see in the mirror is an *image*. Rays of light are reflected at an angle equal to that with which they strike the reflecting surface. For this reason, images of objects mirrored in bodies of water are inverted. This can be illustrated by laying a mirror on a table and setting an object beside it. In Fig. 1, the ray from the top of the candle

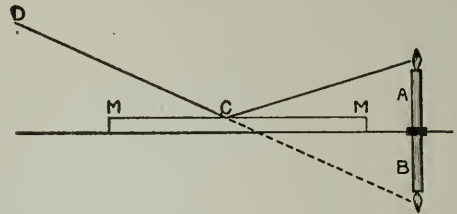


FIG. 1

A strikes the mirror MM at C and is reflected to the eye at D; the flame is seen in the direction of the reflected ray and appears near B. This is true of all the rays; so the image of the candle is inverted.

Light may be reflected a number of times. We see objects by the moonlight which they reflect, and we know that the moon's light is reflected from the sun. When we see an image in a mirror, the light from the object is reflected to the mirror and from that to the eye.

REFRACTION OF LIGHT. When a ray of light passes from one substance to another of a different density, it is bent out of its course, or *refracted*. If we stand a stick in a pail of water, it appears to be bent or broken at the surface of the water; the handle of a spoon in a cup of clear tea presents a similar appearance. The object is seen in the direction of the refracted ray. In Fig. 2, the stick AB appears bent at

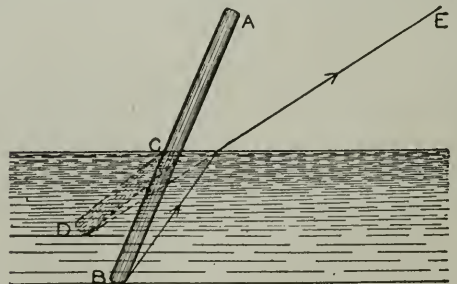


FIG. 2

C, on account of the refraction caused by the water. The eye sees the end B in the direction of the refracted ray, and it appears at D instead of where it really is. This is the reason why

the bottom of a vessel filled with water appears some inches above the support upon which the vessel rests.

When a ray of light passes through a triangular prism, it produces the effect shown in Fig. 3.

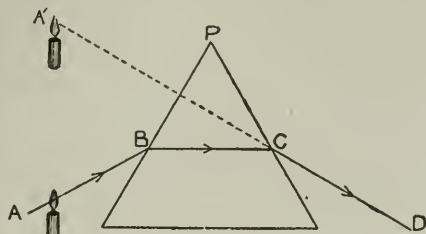


FIG. 3

The ray from *A* is refracted at *B* toward *C*. On leaving the prism at *C*, it is bent towards *D* and the candle is seen at *A'*.

The law of refraction is: When light passes from a rare to a dense substance, it is bent in the direction of a line that is perpendicular to the surface of the refracting body; when light passes from a dense to a rare substance, it is bent away from a line perpendicular to the surface of the refracting body.

Rays of light passing through a window pane are refracted twice, but in such a manner as to make them appear straight, as shown in Fig. 4.

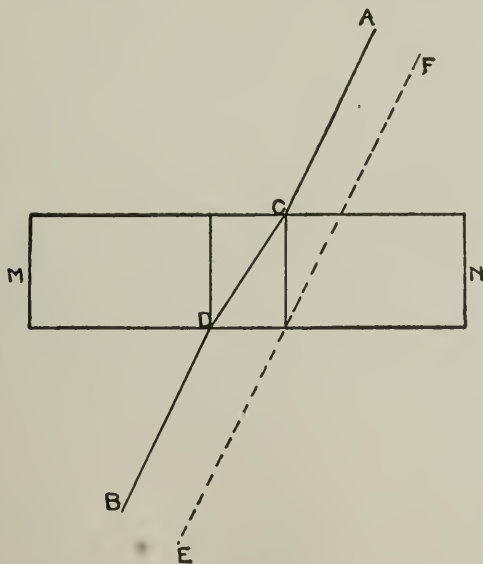


FIG. 4

The ray *AB* passing through the pane *MN* is refracted at *C* and *D*, but it has the same general direction as the line *EF*.

THE SPECTRUM. When sunlight is passed through a triangular prism, the rays are separated by refraction and form the colors seen in the rainbow. The band of color so formed is called the solar, or prismatic, *spectrum*. From this experiment we learn that white light is composed of seven colors (See **SPECTROSCOPE**). The explanation of the action of light is further illustrated in the articles **COLOR**; **LENS**; **MIRROR**; **POLARIZATION OF LIGHT**; **PRISM**; **RAINBOW**. For the application of the principles of light, see **CAMERA**; **MAGIC LANTERN**; **MICROSCOPE**; **SPECTROSCOPE**; **TELESCOPE**. For a new theory of light, see **ELECTRO-MAGNETIC THEORY OF LIGHT**.

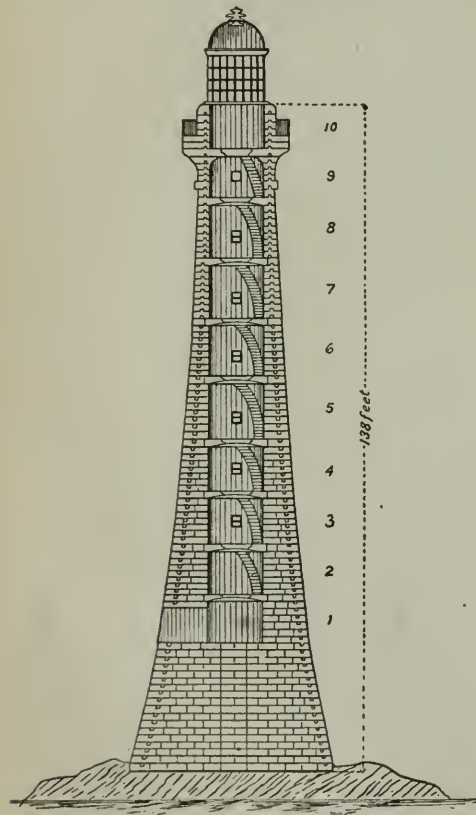
Light'house, a tower or other elevated structure bearing a light at the top and erected at the entrance of a harbor or on some rock or headland to serve as a guide or warning of danger to navigators at night. The Pharos of Alexandria, erected about 300 B. C., is, as far as known, the first structure erected expressly for a lighthouse. This tower was so high that it was reckoned among the seven ancient wonders of the world. The Egyptians, Phoenicians, Greeks and Romans used systems of lights for the guidance and protection of their mariners, but during the Middle Ages these were lost with many other institutions of that ancient civilization. The lighthouse of Cordouan, at the mouth of the Garonne in France, founded in 1584 and rebuilt on an improved plan in 1727, can be considered as the forerunner of modern lighthouses. Its tower is 197 feet high, and it is a model of strength and neatness. The first lighthouse in the United States was erected in 1716, on the north side of the entrance to Boston Harbor. All seafaring nations now maintain elaborate systems of lighthouses.

CONSTRUCTION. The plan of a lighthouse and the material of which it is constructed depend upon its location and the distance to which it is necessary to throw the light. Wherever possible lighthouses are placed on high promontories or other sites on the mainland where they will be free from the action of waves, but many of them have to be located on very dangerous places and are subject to great strain from the waves and, in some instances, from floating ice. Lighthouses built in such positions are constructed of the strongest masonry. The tower is in the form of a truncated cone, gradually sloping as it ascends. The construction of the foundation is usually the most difficult and expensive part of the work, since it often happens that this must be laid under water, under such conditions that

Lighthouse

the work can be done only during periods of low water and when the sea is quiet. After the foundation is completed, the tower rises with comparatively little difficulty. The stones are doweled and cemented together so as to make the walls particularly firm. For the strongest towers the walls at the base are usually five or more feet in thickness and gradually narrow until at the top they are about eighteen inches in thickness. The interior of the tower is usually lined with brick, and between the walls there is left a narrow space for dead air.

As shown in the illustration, a lighthouse is usually divided into the following sections: A



LIGHTHOUSE

1, Cistern and entrance; 2, fuel room; 3, workshop, 4, store room; 5, kitchen; 6 and 7, bell rooms; 8, office room; 9, oil room; 10, light room.

cistern, for storing fresh water; a storehouse for supplies; a shop; the living rooms, for the keeper and his family, and the lantern, which surmounts the tower. All of these compartments are connected with one another by stairways.

The lantern is the most important part of the structure, and it is for this that the tower is

Lighthouse

erected. In all of the best lighthouses of modern construction, the lantern consists of a light metallic frame, holding in position a series of lenses and rings, which form the sides. In the largest lights this lantern is about twelve feet in diameter and ten feet high. The number of sides or faces depends upon the style of light desired. The simplest of these lanterns have but four faces, but they may have as many as eight or ten. The center of each face contains a large plano-convex lens (See LENS), and this is surrounded by a series of prisms, each of which is the portion of a ring and has its sides and edges so cut and curved as to reflect all rays of light which strike it from the lamp so that they will be parallel to one another. The lantern is mounted on a vertical shaft and is supported either in a tank of mercury or upon conical rollers which move over a hard, smooth metallic track. When in use the lantern is caused to revolve by clockwork, which is kept in motion by a weight. Lanterns of this style and of the best construction will throw light so that it can be seen for twenty miles. The light can be seen only when a face of the lantern is directly opposite the observer, hence a revolving light is a flash light, and in one revolution the lantern gives as many flashes as it has sides. By covering any side with red glass a red light is produced, and some lanterns are arranged to give red and white lights.

The lamp is a comparatively small structure. In small lanterns it resembles very closely the largest sized kerosene lamps having circular wicks, but in the larger lights the lamp contains two or more circular wicks arranged one within the other and each in its special tube. These lamps burn the best grade of kerosene.

Lighthouses of similar structure, containing stationary lights, with reflectors in the shape of a parabola or closely resembling those used in the headlights of locomotives, are found at numerous points on the coast, where an intense light is not required. In some localities, where there is no danger from the action of the waves or from ice, steel towers in the form of trestlework are used, and occasionally a wooden tower is found.

LIGHT-SHIPS. There are many places dangerous to navigation where a lighthouse cannot be erected, and light-ships are used to warn mariners of their approach to such points. The ship carries two or more reasonably high masts, from the top of which lights are suspended. It is moored near the point of danger and securely anchored so that it will be enabled to

ride out the severest storm without breaking from its moorings. One of these ships off the shoal at Nantucket is more than twenty-five miles from land. The keeper of the light receives his supplies through a lighthouse tender, which visits the ship and other lighthouses in its district at regular intervals.

MANAGEMENT. The lighthouses in the United States are under the control of the United States Lighthouse Board. This is an organization authorized by Congress in 1852 and consists of the secretary of the treasury, who is ex-officio its president, two naval officers, two engineers and two civilians of noted scientific ability. All are appointed by the president. All matters pertaining to lighthouses, buoys and other agencies for the protection of vessels in harbors and along the coast are in charge of this board. By them the country is divided into sixteen districts, each of which is under the management of a naval superintendent. Lighthouse tenders, which are vessels in the employ of the board, make periodical visits to all lighthouses. These ships carry inspectors who inspect the lighthouse and report upon its condition, and they also carry the needed supplies for the light and the keeper's family. See **BUOY**; **FOG SIGNALS**.

Lightning, *lite'ning*, a very bright flash of light between two clouds or between a cloud and the earth. Franklin proved that a flash of lightning was the same as a spark from the conductor of an electric machine (See **ELECTRIC MACHINE**), except that it is on a much larger scale. The clouds act as condensers upon which the electricity gathers, and when two clouds oppositely electrified approach each other, a discharge occurs. If the clouds are in the lower atmosphere, the discharge takes the form of a zigzag line of very brilliant light, the irregular path being caused by the fact that the discharge follows the line of least resistance. When a discharge occurs in the upper regions of the atmosphere, it frequently takes the form of a flash or sheet of flame. Since this form of discharge is usually seen during warm weather, it is called *heat lightning*. When a heavily charged cloud approaches the earth, the discharge frequently occurs between the earth and the cloud. This forms what is termed a *thunderbolt*.

The discharge usually follows some conductor, like a tall tree, chimney or building, and is usually so powerful as to damage or destroy the conductor. Following the thunderbolt there is a return shock, which establishes the equilibrium between the earth and the atmosphere. This

shock is usually felt for some distance around the point where the thunderbolt strikes, and it is this, rather than the bolt itself, that causes many of the effects produced by the discharge, such as throwing people down, or stunning them, breaking glass and doing other damage. Sometimes the return shock is sufficiently powerful to kill men and animals. Thunder is due to the sudden disturbance of the air, produced by the discharge. The long rolling effect is probably due to echoes from the clouds, but it may be due partly to a number of discharges at different distances from the observer. The report following a thunderbolt resembles that of a cannon. See **LIGHTNING ROD**.

Lightning Rod, an instrument by means of which either the electricity of the clouds, the cause of lightning, is conducted without explosion into the earth, or the lightning itself is received and conducted quietly into the earth or water without injuring buildings, ships or other structures upon which the rod is placed. The lightning rod was invented by Benjamin Franklin about 1752, and it met with general adoption. It usually consists of a stout iron rod, with one or more points at the top, the lower end being metallically connected with thick strips of copper or iron, which are carried into the ground to a considerable depth and laid, if possible, in water or wet earth. The rod is insulated from the building by passing through glass insulators, which are attached to the supports. See **LIGHTNING**.

Light-Ship. See **LIGHTHOUSE**, subhead *Light-Ships*.

Lig'nite. See **COAL**, subhead *Lignite*.

Lig'urite, a mineral occurring in oblique rhombic prisms, of an apple-green color, occasionally speckled on the surface. It is so called on account of its being found chiefly in Liguria. Its color, hardness and transparency have caused it to be classed as a gem.

Li Hung Chang, *le hoong chahng*, Earl (1823?-1901), a Chinese statesman. As governor of the Kiang provinces, he put down, in conjunction with General Gordon, the Taiping rebellion. He was viceroy of the Province of Chi-li and senior grand secretary of state from 1870 to 1894. Earl Li was commander of the Chinese forces during the war with Japan and negotiated the treaty of peace. In 1896 he represented his government at the coronation of the czar and visited the United States. After he had returned to China he became the real head of the foreign office. In 1899 he was decorated

with the Double Dragon, an unusual honor, and in 1900 he was appointed with Prince Ching to negotiate a treaty with the foreign powers operating in China. Li Hung Chang was one of



LI HUNG CHANG

the foremost diplomats and statesmen of his age, and he managed the affairs of his country with consummate skill. He was a friend of Western culture, and to him is due much of China's progress.

Li'lac, a shrub belonging to the olive family, cultivated commonly in gardens for its large clusters of fragrant flowers. Many varieties are known, both single- and double-flowered, and white, blue or purple in color. The common lilac, which was introduced into Europe from northern Persia, grows freely in almost any good soil and spreads rapidly by means of suckers.

Liliuokalani, *le le oo'o ka lah'ne*, LYDIA KAMEKEHA (1838-), the last independent ruler of the Hawaiian Islands. She succeeded her brother, King Kalakaua, in 1891, but she immediately aroused the greatest antagonism among her subjects by a policy of reaction against the liberal laws which had prevailed. A body of white citizens of the islands finally deposed her in January, 1893, and organized a republic, with Sanford B. Dole, an American, at its head. The new government desired annexation to the United States, but this was opposed by President Cleveland, who declared that United States forces had been instrumental in establishing the Republic and demanded the restoration of the

queen to power. This demand was not heeded, however, and the queen was compelled to retire to her private estates in Honolulu. See HAWAIIAN ISLANDS, subhead *History*.

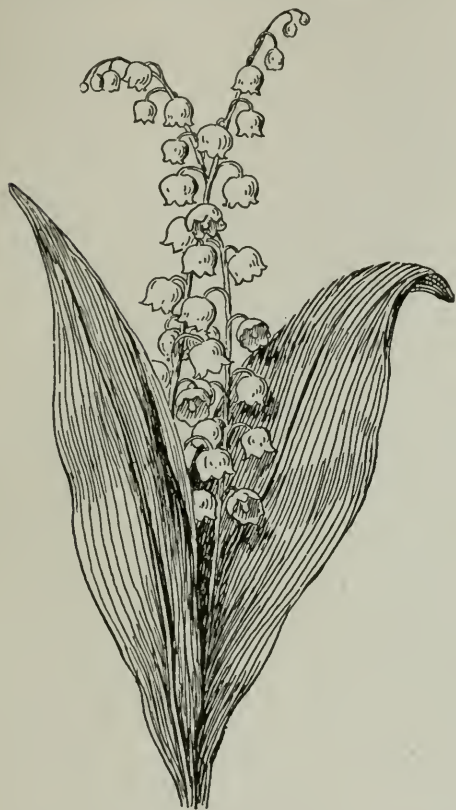
Lille or **Lisle**, *leel*, a fortified city of France, capital of the Department of Nord, situated on the Deule, 155 mi. by rail n. by e. of Paris. The city is well built and contains a number of public squares and open places. Among the chief public buildings are the Renaissance town-hall; the Porte de Paris, which was built in the seventeenth century to commemorate the union of French Flanders with France; the Palais des Beaux Arts, and a number of prominent churches. The city is the seat of a Protestant university and of a Catholic university; also of an Institute of Technology and a Pasteur Institute. The municipal library contains 100,000 volumes, and the city has a number of museums of natural history and archaeology. Lille is one of the leading cities of France in the manufacture of textiles, and its mills produce large quantities of linen and cotton goods. Other important industrial establishments are machine shops, sugar refineries and chemical works. The city is strongly fortified, its forts having a circuit of about thirty miles. Population in 1901, 210,691.

Lily, the common name of a large family of plants and also of the characteristic genus of that order. The leaves and stem are produced from a scaly bulb and bear at the summit flowers which are in many species large and elegantly formed. The typical lily has a colored perianth of six parts, either tubular with spreading divisions, bell-shaped or with re-curving parts. Many of the lilies are common in cultivation and are among the favorite plants of the gardeners, though some which are commonly known by the name of lily belong to very different families, as, for instance, the calla and the water lily. White lilies are universally regarded as emblems of purity and innocence, and among these are the Easter, or Bermuda, lily, the Mediterranean lily and the beautiful Chinese and Japanese varieties, with their rosy or golden markings. In the United States there are about twelve native species, four of which grow east of the Mississippi. These are red or orange-red in color, spotted, or mottled, with dark shades or black.

Lily of the Valley, a beautiful little plant of the lily family. It bears a dozen or more small, white, bell-shaped flowers on a slender stalk, which rises from between two large, dark-green leaves. Its beauty and the pleasing fra-

Lima

grance of the flowers make the lily of the valley one of the most popular of cultivated plants. Under favorable conditions it spreads rapidly in



LILY OF THE VALLEY

rich gardens and requires very little attention. Florists force the plant to bloom at all seasons of the year, but in outdoor gardens it appears early in the spring.

Lima, *le'mah*, the capital of Peru, is situated on the Rimac, 7 mi. from Callao, its port on the Pacific. Among the chief buildings the most notable is the cathedral, begun in 1535. The houses are for the most part built of adobe, with plaster stuccoes. The manufactures are unimportant, but there is a considerable import and export trade through the port of Callao. The climate is very agreeable, but the locality is subject to earthquakes. Lima was founded in 1535 by Pizarro and was called Ciudad de los Reyes (City of the Kings). In January, 1881, Lima capitulated to the Chileans, who occupied it for two years. Population, estimated at 130,000.

Li'ma, OHIO, the county-seat of Allen co., 72 mi. s. w. of Toledo, on the Ottawa River and on

Lime Light

the Cincinnati, Hamilton & Dayton, the Erie, the Pennsylvania and other railroads. The city is in the great petroleum and natural gas belt of the state and ships large quantities of oil. It contains extensive railroad shops, locomotive and car works, machine shops and refineries. Lima College is located here. Population in 1900, 21,723.

Lime, a small globe-shaped lemon, the fruit of a shrub about eight feet high. It is a native of India and China, but was introduced into Europe long before the orange and is now extensively cultivated in the south of Europe, the West Indies and some parts of South America. The fruit is agreeably acid, and its juice is employed in the production of citric acid and in the preparation of beverages.

Lime, the oxide of calcium, produced by heating limestone, or calcium nitrate. Pure lime is perfectly white, has the properties of a strong lye, dissolves slightly in water and is not affected by heat. The ordinary quicklime of commerce is made by heating some varieties of limestone in kilns. The heating drives off the carbon dioxide and leaves the lime. The limestone is usually put in at the top of the kiln, and the lime is taken out at the bottom. This lime is not pure, but answers for most purposes for which lime is used. The best quality is obtained from marble. Hydraulic lime is obtained by burning limestone that contains some silica and clay. When burned, these substances form with the lime a compound which hardens under water.

Lime is used for making mortar, cements, glass and numerous other commodities. It is also used in tanning, to remove the hair from skins; for a fertilizer, in the manufacture of soap and as a flux in smelting ores. Slaked lime is made by pouring water upon quicklime. Unless used immediately, slaked lime absorbs carbon dioxide from the air and becomes worthless. The limewater used in medicine is prepared by dissolving a small quantity of pure lime in water. See CEMENTS; METALLURGY; MORTAR.

Lime Light or **Oxyhy'drogen Light**, a brilliant light, produced when a jet of mixed hydrogen and oxygen gas is ignited and directed on a solid piece of lime. It is commonly used in magic lantern exhibitions; and the two gases are kept in separate air-tight bags or iron cylinders, into which the gas is forced under very high pressure. From these receptacles, tubes conduct the gases to meet in a common jet. Elec-

tric light has largely taken the place of the lime light.

Lim'erick, a city of Ireland, capital of Limerick co., and itself a civic county. It is built on both sides of the Shannon and is 106 miles south-southwest of Dublin. The three parts into which the city is divided are known as English-town, Irishtown and Newtown Pery. The industries include the curing of bacon, flax spinning and weaving and lace making. There are distilleries, breweries, tanneries, corn mills, a large military clothing establishment and ship-building slips. Limerick is the leading port on the west coast of Ireland for the shipment of produce. Population in 1901, 39,873.

Lime'stone, a common rock, composed of lime and carbonic acid. The ordinary limestone is of a grayish color and is somewhat coarse-grained, but there are many varieties, varying in color from white, as in the pure marble, to black. The pure limestone forms in crystals, which from their form are often called dog-tooth spar. Iceland spar is another pure variety. When changed by heat in the earth, limestone becomes marble (See MARBLE). Limestone forms about three-fourths of the sedimentary rocks. It is not so hard as granite, but is strong and constitutes an excellent building stone for foundations and walls where a nice finish is not required. It is also used as a flux in smelting iron ore, in the manufacture of glass and for making quick-lime (See LIME). Acid is a good test for limestone, since it always effervesces when acid is applied.

Limoges, *le mohzh'*, a town of France, capital of the Department of Haute-Vienne and former capital of Limousin. The principal industry is the manufacture of artistic porcelain, known as Limoges ware. About 6000 men are employed in making this porcelain. There are also wool and cotton spinning mills, cloth factories, foundries, paper mills and extensive shoe and clog making establishments. Limoges is the seat of a bishop. Population in 1901, 70,593.

Li'monite, a very important ore of iron, the varieties of which are bog iron ore and brown hematite. It is of a brownish color, occurs in rounded masses and is found in various parts of England and abundantly on the Continent and in America. See HEMATITE.

Lim'pet, a mollusk which adheres to rocks, partly by the suction of its broad, disk-like foot and partly by a sticky secretion. The common limpet is often found sheltered in a shallow bed, excavated by itself out of the rock. From this

pit the limpet, when covered by the tide, makes short journeys in search of its food, which consists of algae, which it eats by means of a long, ribbon-like tongue, covered with rows of hard teeth. The limpet is used as bait by fishermen and is eaten by the poorer classes of Scotland and Ireland. Some of the tropical limpets grow to be about a foot wide.

Lincoln, *link'on*, capital of Lincolnshire, England, 130 mi. n. w. of London. The city is very imposing in appearance, being situated on a hill which is crowned by the cathedral. Among the interesting buildings are the remains of the Norman castle, the palace and stables of John of Gaunt and the townhall. The cathedral, which is one of the finest in England, has three towers, two of which are 180 feet in height and the third 300 feet high. In the central tower hangs the famous bell called Tom of Lincoln. The city has several schools and charitable institutions. There are several iron foundries, manufactories of steam engines and agricultural machines, and large steam flour mills. It is the center of an important trade in live stock, corn and wool. It is also noted for the horse races which are held here. Under the Romans and also under the Saxons and Danes, Lincoln was a place of importance, being specially famous in the time of the Norman conquest as a place with an extensive shipping trade. Population in 1901, 48,784.

Lincoln, ILL., the county-seat of Logan co., 29 mi. n. e. of Springfield, on the Chicago & Alton and the Illinois Central railroads. The city is in a farming region, near extensive deposits of coal. The chief manufactures are of flour, horse collars, mattresses, caskets, clay products, excelsior and cellulose. Lincoln University is located here, and the city has a Carnegie library, several hospitals and children's homes, including the state institution for imbecile children. The place was settled in 1835 and was incorporated in 1854. Population in 1900, 8962.

Lincoln, NEB., the capital of the state and the county-seat of Lancaster co., 55 mi. s. w. of Omaha, on the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Missouri Pacific, the Chicago & Northwestern and other railroads. The most prominent buildings are the capitol, the Federal building, the courthouse, Saint Elizabeth's Hospital and a Carnegie library. There are excellent railroad facilities, making the city an important distributing point; the water is of good quality, being of the artesian type. Flour, furniture,



ABRAHAM LINCOLN

leather goods, brooms, farm implements, paints, creamery products and clothing are the chief manufactures. Lincoln is renowned as being one of the few prohibition capitals; it is an important educational center, there being located here the University of Nebraska, Nebraska Wesleyan University, Cotner University, Union College, the Nebraska Military Academy and two large Chautauquas—Bethany Assembly and the Epworth Assembly. The site was chosen for the city in 1859. It was made the capital and named in honor of Abraham Lincoln in 1867. Population, 1909, estimated, 60,000.

Lincoln, ABRAHAM (1809-1865), an American statesman, sixteenth president of the United States. He was born in a frontier cabin on Nolin Creek, Hardin (now Larue) County, Ky. His ancestors were Quakers. His parents, who had lived amid the rude surroundings of the Kentucky frontier, had had little opportunity to acquire an education, but were simple, industrious, kindly people, who desired for their son the opportunities which they had lacked. At the age of seven, Lincoln was taken by his parents to Spencer County, Ind., where his mother died in 1818. In the following year, his father married again, and the stepmother took an affectionate interest in Abraham's life and encouraged him to study. For ten years after going to Indiana, Lincoln took up a variety of humble employments; in 1828 he made a voyage to New Orleans on a flat-boat, and after the family's removal to Macon County, Ill., in 1830, he helped his father clear a farm, there laying the foundation for the nickname *rail splitter*, which in after life assisted him in his candidacy for public office. It was in 1831, upon a second trip to New Orleans, that his sensitive nature was outraged by witnessing the sale and maltreatment of negroes.

Up to this time he had received less than one year of regular schooling, but he now devoted himself to the study of law, while acting as clerk, grocer, surveyor and postmaster at New Salem. In 1832 he enlisted in the Black Hawk War, was promoted to captain and served for three months. After his return, he was a candidate for the legislature and was defeated, but was elected in 1834 and was reelected for three successive terms. He was admitted to the bar in 1837 and began practice at Springfield, the state capital. He married in 1842 and soon began an active career in politics. Finally, in 1846, he was honored with election to the House of Representatives. He served but one term and did not win partic-

ular distinction, but voted consistently against the slavery party.

It was not until 1854 that he devoted himself in earnest to the struggle against the extension of slavery. In that year he met Douglas in a debate before the Illinois legislature over the Kansas-Nebraska Bill, winning such fame by his remarkable logic and forceful expression that he was made the anti-Nebraska candidate for senator. He was defeated by Lyman Trumbull. In 1856 his name was pressed for vice-president on the Republican ticket with Fremont, but he was defeated. Two years later occurred the famous series of public debates by which, though defeated in his candidacy for senator, he attracted the attention of the whole country. In them he displayed not only admirable sincerity and insight, but exceptional political shrewdness, and it was not long before his name was prominently mentioned as a candidate for president. His famous Cooper Union speech in 1860 at New York made him the most conspicuous figure in Republican politics, and at the convention at Chicago, after a spirited contest with Seward, Chase, Cameron and Bates, he was nominated upon a vigorous anti-slavery platform. The campaign which followed was one of the most momentous events in the history of the United States. The Democratic party, having been disorganized and divided, presented two candidates, Douglas and Breckenridge, while the Constitutional Union party, who took a neutral stand, nominated John Bell. Lincoln's victory was an easy one, though he failed to receive a majority of all the votes.

His election was the signal for secession by South Carolina, which had long contemplated the possibility of such a step if the demands of the slavery faction were not heeded. The action was taken in December, and South Carolina was followed by the Gulf States and within a few months by four others. Lincoln was inaugurated March 4, 1861, and in a memorable address he urged the people of all sections to unite in upholding the Union. He called to his cabinet all his principal rivals in the Chicago convention, and by every means in his power he sought to avert a civil war, which seemed inevitable. His efforts were in vain, however, and on April 14 the war began with the bombardment of Fort Sumter. (The events of that struggle may be more appropriately discussed in the articles, CIVIL WAR IN AMERICA and UNITED STATES, subhead *History*.)

Throughout the war Lincoln displayed the

same firmness, sagacity and generosity which he had disclosed in his previous career, and it was largely due to his persistent efforts at recruiting that the Union armies were finally able to put down secession. The most important political event of the whole struggle was doubtless the announcement of the Emancipation Proclamation, the preliminary proclamation being issued September 22, 1862, and the final document, January 1, 1863. Just as the end of the war seemed near, General Lee's great army having surrendered to Grant at Appomattox Court House (April 9), Lincoln was assassinated while attending a performance at Ford's Theater in Washington, the evening of Good Friday, April 14. He died the following morning. The funeral was unparalleled in its solemnity and magnificence, and the mourning was universal. Southern leaders mourned his loss as that of a sincere and magnanimous opponent. European statesmen united in conceding to him all the highest qualities of manhood and statesmanship, while the grief of the people of the North, who had considered him their truest friend—indeed, their savior—was almost too great for expression.

The years since his death have served to raise, rather than to lower, the general estimate of his service to the Union and of the high moral qualities which his character exemplified. Consult biographies by Schurz, Arnold, Tarbell and Nicolay and Hay, and Lowell's *Commemoration Ode*.

Lincoln, BENJAMIN (1733–1810), an American soldier, born at Hingham, Mass. He was elected to the legislature and in 1775 was chosen colonel of a Massachusetts regiment. He was active in organizing the Continental Army in the following year and was present at the Battle of Bunker Hill as major general of Massachusetts troops. He also fought at the Battle of White Plains, and in February, 1777, he was made a major general in the Continental Army, being second in command to General Gates in the Burgoyne campaign. He was wounded October 8 and was crippled for life, but he resumed his service in August, 1778, assuming command of the Southern army. He was unfortunate in his campaigns, being defeated at Brier Creek and repulsed at Savannah, and was finally compelled to surrender at Charleston, May 12, 1780. He became secretary of war in 1781 and retired three years later. He commanded the Massachusetts militia in Shays's rebellion, and in 1789 he became collector of the port of Boston.

Lincoln, ROBERT TODD (1843–), an American lawyer and politician, born at Spring-

field, Ill., and educated at Harvard. He was the eldest son of Abraham Lincoln, and in the Civil War he served as captain on General Grant's staff. After the war he went to Chicago and practiced law. In 1881 he became secretary of war in President Garfield's cabinet, and he was United States minister to England during Harrison's administration. He became identified as counsel and later as officer with the Pullman Palace Car Company.

Lincoln Cathedral, probably the finest church in England, as regards size, beauty and location. It crowns the hill on which the city of Lincoln is built. It is about 500 feet long and 220 feet wide, and it has three towers, two of them 180, and the third 300, feet high. The original cathedral was built at the end of the eleventh century, but only a small portion of that now remains.

Lind, JENNY (Madame Otto Goldschmidt) (1820–1887), a Swedish soprano, born in Stockholm. She received her musical training under Garcia at Paris, achieved her first success in Berlin in 1845 and subsequently was received with a great ovation in her native city of Stockholm. She made her first appearance in London at Covent Garden in 1847 before an enthusiastic audience and then went to the United States, where she married Herr Goldschmidt in 1851. Returning to Europe, she made an extensive tour, finally settling in England. In later years she seldom came before the public.

Lin'den, a handsome forest tree of Europe. The wood is rather soft and close-grained and is much used by turners. See BASSWOOD.

Lindsay, *lin'zy*, a port and the county-seat of Victoria co., Ontario, Canada. It is on the Grand Trunk railway, 70 miles n. e. of Toronto. Its trade in lumber and grain is extensive, and it is an important railway center. Population in 1901, 7003.

Line, a geometric magnitude having but one dimension, length. It is also sometimes regarded as a boundary between two surfaces or as the path of a moving point. A *straight* line does not change its direction between any two of its points. A *curved* line, or *curve*, changes its direction between every two points. A *broken* line is a continuous succession of straight lines in different directions. A *mixed* line is one composed of straight and curved lines. In analytical geometry it is shown that every line may be expressed by an algebraic equation containing two variable quantities, and that every such algebraic equation represents a line. See

COORDINATES; ANALYTICAL GEOMETRY; GEOMETRY.

Lin'en, the name of a fabric made of flax. It is of very ancient use, pieces being in existence which are over four thousand years old. The cloths in which the Egyptian mummies are wrapped give evidence of its early and extensive manufacture in Egypt. The Jews are supposed to have introduced linen manufacture into western Asia, and here the Greeks got their knowledge of it. It was not until the late years of the Republic that the Romans had it in common use, and at that time the priests wore linen garments. In the Middle Ages linen was made extensively in all parts of Europe and especially in Italy, Spain, Flanders and France. The Flemish weavers introduced it into England. The soil of France is especially adapted to the growth of flax, and the linen industry here surpasses that of any other country, though Belgium, Holland and Ireland are close rivals and have very fine products. The United States did not begin to manufacture linen until the eighteenth century and has not developed this industry to a great extent. There is more linen in the United States in proportion to its population than in any other country.

The flax is reduced to thread, which is spun into yarn for weaving by means of machinery, which is the same as that used for cotton, except for some special adaptations. Linens are superior to cottons in many respects, being smoother, stronger and of brighter luster; they are cleaner and cooler material for summer clothing. They are, however, more expensive. The chief kinds of linen manufactured are lawn, of fine quality; muslin, produced in Ireland; damask, used for tablecloths and the like, and cambric, an exceedingly fine linen fabric. Coarse linen fabrics are sheets, towings, crashes, duck and canvas. See FLAX.

Ling, a species of sea fish allied to the cod family and measuring from three to four feet in length. The color is gray, shading to olive green, and on the belly, white. It abounds around the British coasts and northern Europe, is caught with hook and line and is preserved in immense quantities in a dried state, under the name of *stockfish*. In the United States the burbot of Lake Ontario is called the ling.

Ling, PEHR HENRIK (1776-1839), a Swedish poet and teacher of gymnastics. Ling was a great traveler through Germany and France, and after teaching fencing at Karlberg he settled in Stockholm and established there a school of

gymnastics. While here he developed a system of exercise which is still used extensively and is known as the *Swedish movement cure*. As a patriotic poet he enjoyed a high reputation, especially from his dramatic works.

Lin'gard, JOHN (1771-1851), an English historian, born at Winchester. He was educated for the priesthood at Douay College, in France. He became a priest, and during the most of his later life he occupied humble positions. Meantime, he wrote and published important historical works, of which the first was *The Antiquity of the Anglo-Saxon Church*. His great life work, however, was *The History of England Until 1688*, which is a scholarly narration of English history, from the standpoint of Catholicism.

Lin'iment, in medicine, an application to be rubbed into the skin for stimulating the tissues and relieving pain. Many official liniments are listed, each having its own peculiar merit, as, for instance, *soap liniment*, used in bruises and sprains.

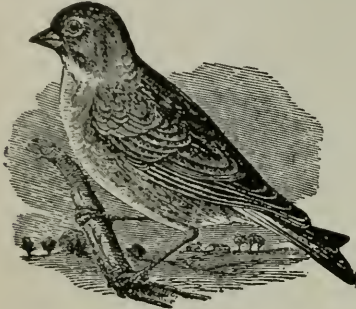
Linnaea, *lin ee'ah*, a delicate little evergreen, of the honeysuckle family, with creeping stems. It is found in woods and in mountainous places in Scotland and other northern countries, including North America as far south as Maryland. Two beautiful, drooping, fragrant, bell-shaped pink flowers are borne on each flower stalk.

Linnaeus, *lin ee'us*. See LINNÉ, KARL VON.

Linné, *leen nay'*, KARL VON (1707-1778), commonly called *Linnaeus*, a great Swedish botanist, was born at Rashult, Sweden. He showed an early interest in botany, but because of poverty was unable at first to go to school; later, through the assistance of a friend, he entered the University of Lund, where his botanical tastes were encouraged. In 1728 he removed to Upsala, where he undertook the supervision of the botanic garden. Here he made the acquaintance of the botanist Rudbeck, whose assistant he became. Aided by the Academy of Sciences at Upsala, Linné made a journey through Lapland, the result of which was shown in his *Flora Lapponica*. After this he went to the University of Harderwyk, in Holland, and took the degree of M. D. While visiting Leyden he published the first sketch of his *Systems of Nature and Fundamental Botany*. One of his most important works is *Species of Plants*. After traveling in England and Paris, he settled in Stockholm as a physician. He became professor of medicine at Upsala in 1741 and then of botany and natural history. The great merit of Linné as a botanist was that he

arranged plants on a simple system of sexual relationship and prepared the way for the more natural and satisfactory classification which has superseded the Linnaean system. Linné is considered the originator of modern systematic botany and zoölogy.

Lin'net, a small singing bird of the finch family, popular as a cage bird in Europe. It is one of the commonest of British birds and breeds



LINNET

in firs and low bushes. The name linnet is given to a number of different species, one of which, the *redpoll*, is found both in Europe and the United States.

Lino'leum, a preparation of linseed oil with chloride of sulphur, by which it is rendered solid and useful in many ways. When rolled into sheets it is used as a substitute for india rubber or gutta-percha; dissolved, it is used as a varnish for waterproof textile fabrics, table-covers, felt carpets and the like; as a paint it is useful both for iron and wood and for ships' bottoms; as a cement it possesses some of the qualities of glue; vulcanized or rendered hard by heat, it may be carved and polished, like wood, for moldings and knife handles; and mixed with ground cork and pressed upon canvas, it forms floor cloth.

Lin'otype, a typesetting machine in general use in the United States. It casts its own type in solid lines as they are set, and its case carries matrices instead of types. The matrices are brass molds used in casting the type. As the operator fingers the keyboard, which resembles the keyboard of a typewriter, the matrices called for are set in order. When a line has been set, the machine moves it automatically to the casting apparatus, where it is properly spaced, or justified, and the matrices are filled with melted type metal, casting the type into a solid line. This is then automatically set in the stick in its proper place, and the matrices are returned by a lever arm to the case, where by means of an

automatic arrangement they are distributed to their proper channels. Each matrix has a number of nicks on the back, and these are used in distributing. They allow the matrix to fall into its proper channel and prevent it from falling into any other. The operator pays no attention to the casting, the placing of the type in the stick or the distribution of the matrices, the machine performing all of these operations automatically.

The linotype is the invention of Mr. Ottmar Mergenthaler, of Baltimore, who spent over twenty years in completing it. It is a very successful machine and is in general use in the composing rooms of large daily papers. By its use one operator can do the work of about eight men working by hand. By using different cases of matrices, more than one style of type can be set by the same machine. The disadvantage of this machine is that when an error is made, it can be corrected only by recasting the entire line.

Lin'seed Oil, the oil prepared from the seed of the flax plant. The seeds are bruised and ground and then put under great pressure. When expressed without heat, the oil is purer. Linseed oil is used principally in paints and varnishes. It is placed on the market in two forms, *boiled*, or *drying*, oil, and *raw* oil. The boiled oil contains a small quantity of oxide of lead, which causes it to dry quickly. It is the kind used in the manufacture of paints and varnishes. When pure, linseed oil is colorless, but the commercial grade is usually of dark amber hue. Its taste and odor are disagreeable. See **FLAX**; **PAINTS**; **VARNISH**.

Li'num. See **FLAX**.

Linz, *lints*, the capital of Upper Austria, a fortified city, situated on the right bank of the Danube, 98 mi. w. of Vienna. The manufactures consist chiefly of woolen and cotton goods, machinery, hardware, vinegar, liqueurs and tobacco. There is an extensive trade on the Danube. Population in 1900, 58,778.

Li'on, one of the largest and strongest of the cat family, distinguished by its tawny or yellow color, tufted tail and, in the male, full flowing mane. When the male is three years old its mane begins to grow; at six or seven years the lion is full-grown, and at about twenty-two it is feeble and decrepit. The lion is a native of Africa and parts of western and central Asia, where it preys chiefly in the night on live animals, for it avoids carrion, unless nearly famished. It approaches its prey with a stealthy pace, crouches when at a proper distance and springs upon it

Lipan

with fearful velocity and force. The lion's favorite haunts are not in the forests, but in level plains, where herds of antelope graze. The lion's whole frame is muscular, the fore parts extremely so. The large head, flashing eye and heavy mane make the animal so noble in appearance that it is called the *king of beasts*. The voice of the lion is a mighty roar and is probably the loudest call among animals. By nature the lion is somewhat cowardly and disinclined to attack man, but when angered or driven by hunger, it becomes fierce and terrible. Still, it is not nearly so dangerous as the tiger, nor does it have the stealthy, treacherous look which distinguishes the tiger and some other cats. Unlike most members of the cat family, lions are unable to climb trees, but they are very agile in climbing about rocks. Of the African lions there are several varieties, as the *Barbary lion*, the *Gambion lion* and the *Cape lion*. The Asiatic varieties are generally smaller, and some lack the mane.

Lipan, *le pah'n'*, formerly a wandering tribe of hostile Athapascan indians, who lived in the southwestern part of the United States. After a period of brave opposition to the settlers, they seem to have disappeared or to have been absorbed by other tribes.

Lip'ari Islands, a group of islands in the Mediterranean, north of Sicily. It comprises the islands, Lipari, the largest; Salina, Vulcano, Filicudi, Stramboli, Panaria and Alicudi. They are of volcanic origin, and two of the islands, Stramboli and Vulcano, have active volcanoes. There are hot springs and pumice stone quarries here. Population in 1901, 20,455.

Lip'pi, FILIPPO (1406-1469), a Florentine painter. He was a pupil of Masaccio, and his works are noted for their warm, transparent color and expression of human sympathy. He is considered the first representative of the Florentine school of painters, and his greatest works now existing are the frescoes in the Cathedral of Prado, which were executed between 1452 and 1464. These frescoes represent scenes from the lives of John the Baptist and Saint Stephen. Lippi's son, Filippo, usually known as Filippino, inherited his father's talent and continued his work with marked distinction.

Liquid, that kind of matter which, if placed in a gas with which it does not mix, as

Liquors

air, forms a spherical drop; or, if placed in a hollow solid vessel, takes the shape of the vessel, maintaining a constant volume. See MATTER.

Liquid Air. By lowering the temperature of air to 220° below zero F., or 140° below zero C., and subjecting it to a pressure of 585 pounds to the square inch, it can be changed to a liquid. For a number of years physicists attempted to liquefy air, without success, because they could not reduce the temperature to the necessary point; but when this difficulty was overcome, it



LION

was found that air could be liquefied more easily than some other gases. The most successful of all experimenters in this line was Mr. C. E. Tripler of New York, who constructed apparatus that enabled him to produce liquid air in large quantities. When exposed in a glass vessel, liquid air absorbs heat rapidly from certain objects and boils violently until it has evaporated. The nitrogen evaporates more rapidly than the oxygen. Notwithstanding its exceedingly low temperature, liquid air can be frozen. It instantly freezes all substances immersed in it. Meat is frozen so hard as to become brittle, and even iron is affected by the temperature. Liquid air is so much colder than ice that when placed in a tin vessel and set upon a cake of ice it boils rapidly. For a time it was supposed that great commercial advantages would be derived from liquid air, but these hopes proved to be without foundation, and now it is regarded only as a curiosity for physical laboratories.

Liquidam'bar, a genus of handsome trees, with lobed shining leaves and catkins, or globular heads of flowers. The fragrant liquid resin, called oil of liquidambar and copal balsam, is obtained from the sweet gum, or liquidambar, of Mexico and the United States.

Liquorice, *lik'or* or *is*. See LICORICE.

Liquors, *lik'kurz*. See DISTILLED LIQUORS.

Lisbon, *liz'bun*, (Portuguese, *Lisboa*), the capital and principal seaport of Portugal, on the right bank of the Tagus, about 7 mi. from the ocean. The old town is built in the form of an amphitheater, on a series of hills, and presents a most picturesque appearance, although it has narrow, ill-paved streets. The new part has broad, well-kept streets and open squares. There are in Lisbon several royal palaces, an old Moorish citadel and numerous notable churches and convents. The exports consist chiefly of wine, oil and fruit, and the principal imports are cotton, cotton tissues, sugar, grain, coal, tobacco and coffee. The manufactures are tobacco, cotton, wool, silk, paper and chemicals. Lisbon is a place of remote antiquity, its earliest name being *Olisipo*. In 1755 it was visited by an earthquake, which threw down the greater part of the city and destroyed over 30,000 of its inhabitants. It was taken by the French in 1807, but resisted an attack by Masséna in 1809. Population in 1900, 357,000.

Lisle, *leel*. See **LILLE**.

Lis'ter, **JOSEPH**, Sir (1827–), an English surgeon, born at Upton, Essex. From 1860 to 1869 he was professor of surgery in Glasgow University; from 1869 to 1877 he was professor of clinical surgery in the University of Edinburgh, and in the latter year he was appointed to the corresponding chair in King's College, London. His name is especially connected with the successful application of the antiseptic treatment in surgery, which inaugurated a new era in this branch of medical science. He has published various papers on surgical pathology. See **SURGERY**.

Liszt, *list*, **FRANZ** (1811–1886), an eminent pianist and composer, born in Hungary. He made his first public appearance in his ninth year, studied in Vienna and Paris, produced an opera in 1825 and became director of the Court Theater at Weimar in 1849. This gave him opportunity to introduce the music of Wagner, Berlioz, Schumann and other modern writers. In 1861 he went to Rome, where he joined the priesthood. In 1870 he became director of the Conservatory of Music at Pest. His chief works are the *Faust* and *Dante* symphonies and the oratorios, *Saint Elizabeth* and *Christus*; but his fame largely rests upon his ability as a pianist, for he has been unhesitatingly accorded first place among the world's artists in that field.

Lit'any, a solemn supplication to God that he will turn aside his anger. Of the three litanies in the Roman Catholic Church, the "Litany of

the Saints" is the only one having a place in the service books of the Church. The other two are the "Litany of the Name of Jesus" and the "Litany of Loreto." The most common form in the early Church was "Kyrie eleison" (Lord have mercy), given by the priest, to which the congregation responded "Christe eleison." It is reported that this was repeated three hundred times in one procession. The use of the litany in Latin churches is required only on Rogation Days, or the Monday, Tuesday and Wednesday before Ascension Day, and on Saint Mark's Day, April 25. It is common, however, on special occasions, as ordinations and consecrations, and is ordered in time of famine, pestilence, war or like calamities.

Litch'field, **ILL.**, a city in Montgomery co., 45 mi. s. of Springfield, on the Chicago, Burlington & Quincy, the Illinois Central, the Wabash and a number of other railroads. It is in an agricultural region near deposits of oil, coal and natural gas. The leading manufactures are railroad cars, foundry and clay products, glass, engines, flour and lumber. The city has a free library, good schools and public parks. The place was settled in 1853 and became a city six years later. Population in 1900, 5918.

Litchi or **Leechee**, *le'che*, the fruit of a tree, native of southern China. The tree is of a moderate size, with brown bark and large leaves, and the fruit is produced in bunches, which hang from the extremities of the twigs. The berry is red or green, about two inches in diameter, with a tough, thin, leathery coat and a colorless, half-transparent pulp, in the center of which is a single brown seed. The pulp is slightly sweet and pleasing to the taste.

Liter, *le'tur*, the standard measure of capacity in the French or metric system. The liter is a cubic decimeter, that is, it contains about 61.028 English cubic inches. It is equivalent to about one English quart, or, more exactly, to .23 gallons.

Lit'erature, a word often used to mean all the writings of a race or people, no matter upon what subject they may be. In a narrower and better sense, however, only those works which are inspiring and whose reading tends to ennoble and elevate human character should be considered as literature. Under this head come those essays, novels, orations, histories and poems which have proved themselves of greatest worth. This article gives a brief historical view of the subject, and by means of references it suggests a wide range of reading (See **HISTORY**; **ORATION**;

POETRY; PROSE). Every language worthy of a name has its own peculiar literature, which is of greatest delight to its own people and which to a certain extent influences the literatures of other tongues. English literature, for example, is indebted to the Greeks, the Latins, the Italians, the French and the Germans for molding influences. Some of our writers have followed the forms of the Greek and Latin poets; others have been influenced by the more musical Italian, and a third class has shown deference to the classic formality of the French.

ENGLISH LITERATURE. The beginnings of English literature may be said to lie in the songs of the Saxon gleemen, who encouraged their warriors in battle and enlivened their victorious feasts with praise of the heroes (See *BEOWULF*). There was an early literature of the Celts, light and poetic, filled with delicate sentiment and humor that the Saxon tongue did not show. Very little of it remains, but it exerted a strong influence on our Anglo-Saxon literature. The first poem that really originated in England is Caedmon's *Paraphrase*, a metrical version of parts of the Bible, which was composed about 670 A. D. Because of his numerous translations of Latin into English, the name of "Father of English Prose" has been given to King Alfred, though his prose was by no means the first (See *BEDE*). The growth of the literature was slow, and it was not until the end of the fourteenth century that the *Vision of Piers Plowman*, the first great poem, was written. At about the same time John Wyclif was translating the Bible into English. Geoffrey Chaucer, the "Father of English Poetry," was born about 1340, and his *Canterbury Tales*, a collection of stories ostensibly told by pilgrims who met at the Tabard Inn and journeyed to Canterbury, are still filled with beauty and charm for the reader who has skill and patience to study them sufficiently to understand the language used by the old poet (See *CHAUCER, GEOFFREY*). With Chaucer may be said to have closed the age of preparation in literature, for thereafter the development was steady and rapid. After the introduction of printing in the fifteenth century books multiplied with great rapidity (See *CAXTON, WILLIAM*); but nevertheless, it was not until the time of Queen Elizabeth, in the latter half of the sixteenth century, that English literature took the position of first importance in the world. Then, awakened as the nation was by the wonderful discoveries and explorations in America, by scientific discoveries and by the

great victories of the navy, England produced a company of writers the equals of whom have scarcely been seen (See *BACON, FRANCIS*; *SPENSER, EDMUND*; *JONSON, BEN*; *SHAKESPEARE, WILLIAM*). Thoughtful essays, filled with the new science and sparkling with the wit of the day; poetry, glowing with the love of nature and splendid with beautiful phrases, and marvelous dramas, never since equaled, were poured out in those fifty resplendent years. The period is said to close with the accession of James I in 1603.

During the Puritan Age, which closed in 1660, England changed her literary style completely and sacrificed her love of the beautiful to her search for truth. Milton, the one great literary man of his age, shows in his poetry the changes that were taking place, for he began his long literary career under the first Charles and did not complete his greatest poem till, old and blind, he lived alone after the Revolution had done its work (See *MILTON, JOHN*). With the restoration of Charles II, the literature of England quickly responded to French influences and rapidly developed into the striking brilliancy and beauty of the age of Queen Anne (1702-1714) (See *DRYDEN, JOHN*; *ROBINSON CRUSOE*; *SWIFT, JONATHAN*; *ADDISON, JOSEPH*; *POPE, ALEXANDER*). It was during this time that *The Spectator*, the first newspaper, vastly different in form from those of the present day, made its appearance. In the latter part of the eighteenth century were to be seen the beginnings of the modern period, the chief characteristics of which were the perfection of oratory and the rise and growth of the novel (See *BURKE, EDMUND*; *RICHARDSON, SAMUEL*; *FIELDING, HENRY*; *GOLDSMITH, OLIVER*). A revival of interest in nature brought the poets away from the strict rules that had made their work cold and dead and filled it with new life and vigor (See *COLERIDGE, SAMUEL TAYLOR*; *WORDSWORTH, WILLIAM*; *BURNS, ROBERT*; *LAMB, CHARLES*; *SCOTT, WALTER, Sir*; *BYRON, GEORGE GORDON NOEL*; *KEATS, JOHN*; *SHELLEY, PERCY BYSSHE*). The impetus given to true art by these great men was continued by the writers of the Victorian Age, who placed English literature at the summit of excellence (See *CARLYLE, THOMAS*; *BROWNING, ELIZABETH BARRETT*; *MACAULAY, THOMAS BABINGTON*; *TENNYSON, ALFRED*; *DICKENS, CHARLES*; *BROWNING, ROBERT*; *ELIOT, GEORGE*; *THACKERAY, WILLIAM MAKEPEACE*).

AMERICAN LITERATURE. In early colonial days there was little that could be called really

American in the writings of the literary men of this country, but, beginning with the excellent prose of Franklin's *Autobiography*, a new life appeared, though it was not until the early part of the nineteenth century that poetry, essays and fiction of a characteristic American type became common (See IRVING, WASHINGTON; COOPER, JAMES FENIMORE; BRYANT, WILLIAM CULLEN; POE, EDGAR ALLEN; PRESCOTT, WILLIAM HICKLING). Before, during and after the Civil War lived a remarkable group of poets, essayists and novelists, the greatest this country has ever known. Most of them resided in and around Boston and were deeply moved by new ideas in religion and by the slavery agitation that was then at its height. These greatest poets, greatest essayists, greatest writers of fiction, greatest historians, placed this epoch on a level with the highest period in England, if we except possibly the age of Shakespeare. To find what was really accomplished, reference should be made to the articles on EMERSON, RALPH WALDO; HAWTHORNE, NATHANIEL; LONGFELLOW, HENRY WADSWORTH; WHITTIER, JOHN GREENLEAF; HOLMES, OLIVER WENDELL; LOWELL, JAMES RUSSELL; PARKMAN, FRANCIS; BANCROFT, GEORGE; MOTLEY, JOHN LOTHROP. Since the Civil War a host of writers in both prose and poetry have kept the level high, and there are now many artists whose graceful writings give the keenest pleasure to thousands of readers (See HOWELLS, WILLIAM DEAN; JAMES, HENRY; LEMENS, SAMUEL LANGHORNE; MITCHELL, S. WEIR; HARRIS, JOEL CHANDLER; FREEMAN, MARY E. WILKINS).

GREEK LITERATURE. The literature of the Greeks has served as a model and inspiration to writers of every age and race. Its poetry is musical and finished, its essays are refined, thoughtful and polished, and its oratory is noble and eloquent. Its great epic, the *Iliad*, is still studied in every school where the language is taught and still has its influence on the writers of to-day. It is a storehouse of allusions which are in constant use, and without a knowledge of it reading becomes difficult (See HOMER; *ILIAD*; *ODYSSEY*). Greek lyric poetry was connected with, in fact was almost a part of, their music. The Greeks employed a great variety of meter and developed many forms of poetry that are still imitated (See SAPPHO; ANACREON; PINDAR). Their historians were numerous, and to them we are indebted for much of our knowledge of the earlier peoples (See HERODOTUS; THUCYDIDES; XENOPHON). In philosophy Greece had no rivals,

and in one way and another her great men overshadowed most that has been perfected in our times (See SOCRATES; PLATO; ARISTOTLE). Her orations were among the greatest ever delivered, and if we consider their effect upon the people, they must be called the greatest. In their modern form they have served as models for many an orator (See DEMOSTHENES). But the greatest triumph of Grecian literature, if we except the *Iliad*, lay in her dramas. Both tragedy and comedy had their origin in Greece in the worship of the god Bacchus, and for beauty, strength and passion, the productions of the old Athenians still rank among the greatest in the world (See ARISTOPHANES; AESCHYLUS; SOPHOCLES; EURIPIDES; THEATER; DRAMA).

LATIN LITERATURE. Scarcely behind the Greeks were the Romans, though the latter were in a sense imitators and really originated few things. Both their prose and poetry, however, have influenced the literature of modern Europe more forcibly than that of Greece and have entered more deeply into the education of mankind than those of any other nation. There was a period of crude beginnings, in which the language was taking form. During this time little was produced that has remained alive. Following this came a period of improvement, which lasted to about 84 B. C., during which time there were many great literary names in Rome, chief of which was Cato. From 84 B. C. to 14 A. D. is usually known as the Golden Age (See VERGIL; *AENEID*; CAESAR, CAIUS JULIUS; CICERO, MARCUS TULLIUS; LIVY). From the death of Augustus to the time of Hadrian is often called the Silver Age (See JUVENAL, DECIMUS JUNIUS JUVENALIS; TACITUS, PUBLIUS CORNELIUS; PLINY, CAIUS PLINIUS SECUNDUS). From then till the fourth century there was a falling off in literary power, and after the fourth century there was a distinct decline that finally resulted in the extinction of Latin as a living language.

ITALIAN LITERATURE. For Italy the fourteenth century was the most brilliant period, although it was the first in which the modern Italian tongue was used. Latin still remained the scholarly language, but a trio of great writers used the language of the people, and the beautiful poems and perfect prose produced by these men made Italy for a time the most prominent literary nation in Europe (See DANTE ALIGHIERI; PETRARCH, FRANCESCO; BOCCACCIO, GIOVANNI). By the latter part of the sixteenth century other nations had taken the lead, and thereafter the influence of Italy became of less and less impor-

tance, only a few writers deserving a world-wide recognition (See ARIOSTO, LUDOVICO; TASSO, TORQUATO). It must be remembered, however, that Italy gave the sonnet to poetry, and that the imagery, metrical forms and materials for plots in both drama and story used by such writers as Chaucer, Spenser and Shakespeare came directly from the Italians or were the fruitful result of their art.

FRENCH LITERATURE. It was not until the sixteenth century that France was moved by the awakening spirit that had caught the souls of the English, but then little tales and polished essays were produced in great number, as the characteristic feature of the age (See RABELAIS, FRANÇOIS; MONTAIGNE, MICHEL). The Golden Age of the French appeared at the end of the seventeenth century, the epoch of Louis XIV. Then her art really dominated Europe, though the full effect of her influence was not felt until some time later. Dramatists, essayists, wits and poets all are represented among her men of genius (See CORNEILLE, PIERRE; RACINE, JEAN; MOLIÈRE; LAFONTAINE, JEAN DE; FENELON, FRANÇOIS DE SALIGNAC). The eighteenth century produced many brilliant men and established France firmly in the high position she to-day occupies. Among her writers of that time are Montesquieu, Voltaire and Rousseau. Of later writers she has many in every field of literature (See HUGO, VICTOR; DUMAS, ALEXANDER; BALSAC, HONORÉ DE; GUIZOT, FRANÇOIS; LAMARTINE, ALPHONSE MARIE).

GERMAN LITERATURE. The literature of Germany did not become of world-wide importance until modern times, though her poems and tales date back beyond Charlemagne (See NIBELUNGENLIED; MINNESINGERS). In modern times, however, the profound scholarship of the Germans has made them leaders in almost every domain of thought, and the names of their great writers are made household words through admirable translations (See LESSING, GOTTHOLD; GOETHE, JOHANN WOLFGANG VON; SCHILLER, JOHANN FRIEDRICH CHRISTOPH VON; KANT, IMMANUEL; HUMBOLDT, FRIEDRICH HEINRICH VON; HEGEL, GEORG WILHELM FRIEDRICH; RICHTER, JEAN PAUL FRIEDRICH).

Other nations than those mentioned have their literature, and some have produced books that have profoundly affected the drift of modern thought. The Hebrew Bible is doubtless the one book to which the literature of the world is most indebted, both as an inspiration and a model. Some of the leading articles to which

the reader is referred for a further acquaintance with the literature of nations not mentioned above are CONFUCIUS; SANSKRIT; VEDAS; AVESTA; TALMUD; BIBLE; APOCRYPHA; ARABIAN NIGHTS; KALEVALA; EDDA; SAGAS; MAHABHARATA. See READING.

Mention of the special literature of the countries not given here may be found under the names of those countries.

Lith'ium, a metallic element of silver-white luster, that quickly tarnishes in the air. Although lithium may be cut with a knife, it is scarcely as soft as potassium or soda. It fuses at 180° C. and takes fire at a slightly higher temperature. Lithium, which is the lightest of all known solid bodies, floats upon rock oil. It is distributed very widely, but always in small quantities. It forms salts similar to those of potassium and sodium, and these are used extensively in medicine. Effervescing lithium water is sometimes used in place of soda or potash water. The citrate of lithia, whose properties are similar to those of the carbonate, is also used by physicians. On account of the splendid red color they impart to flame, some of the lithium compounds are used in the manufacture of fireworks.

Lithography, *lith og'ra fy*, the art of printing from specially prepared stones. The stone used is a fine-grained limestone of light gray color and is generally known as *lithograph stone*. That of the best quality is obtained in Bavaria, where most of the world's supply is secured.

Lithography is based on the principle that grease and water will not mix, and the preparation of the stone consists in so treating the surface that the portion containing the drawing will retain ink, while the remaining portion will not. The stones are cut into slabs 4 inches thick and varying in size from 6 by 8 inches to 44 by 62 inches. The surface of the stone is ground to a grain resembling that of fine drawing paper or polished with pumice stone, according to the style of print to be made. If the picture is to be drawn with a crayon, the ground surface is used, but if it is to be worked on with a pen, the polished surface is required.

After the stone is prepared, the picture is drawn upon it with a lithograph crayon, just as it appears in the copy, except that it is reversed, like the face of a type. The drawing is then washed with a solution of gum arabic and nitrate of soda, to keep the grease from spreading and to render the other portions of the surface more porous and more capable of absorbing water. After the coating of acid and gum is dried, the

stone is washed with water, then with turpentine, which removes all traces of the drawing except the grease from the crayon. The turpentine is then removed by washing with water, and the stone is ready for use. When the picture is engraved on the stone, the work is done in a manner similar to that of engraving steel or copper. See ENGRAVING.

In printing, the stone is first wet with a sponge. The water does not stick to the greased portion constituting the picture, so that part of the surface remains dry while the other is wet. When ink is applied the process is reversed. The ink sticks to the greased surface in such a way as exactly to reproduce the drawing when the paper is pressed upon it, while it leaves the wet surface clean. The printing is done in a cylinder press especially prepared for this work, and transfer plates, made by transferring the picture from the stone to a metal plate, are usually employed. By this means a number of pictures can be impressed upon the same plate, so that by using a large sheet of paper several pictures are produced at each revolution of the press.

COLOR LITHOGRAPHY. This is the process of producing lithograph pictures in the natural colors of the object and differs from ordinary lithography only in the elaboration of the process. First, a good plate or stone is made, which contains the complete outline of the picture. This plate contains registering marks on each of its margins, and all of the other plates must be made to register accurately with it. Each color requires a special plate, and the final effect is produced by printing in the right order the different colors required. This order is usually yellow, red, brown, or gray, blue and then the tints of any other colors necessary. The color plates in this encyclopedia are produced by color lithography.

PHOTO-LITHOGRAPHY. This is a combination of photography and lithography, now in quite general use. By this process the outline of the picture is photographed on a sensitive film, which is placed on the surface of the stone. This is used in producing the outline of the picture (See PHOTOGRAPHY). From this outline the stone is prepared and the printing is done in the same manner as in ordinary lithography.

Lithography reproduces art work of a high order of excellence and is often employed to reproduce in an inexpensive way paintings and other works of the old masters. It is also very generally used in the production of colored pic-

tures and for engraving letter heads and illustrations used in high class advertisements.

Lithotomy, in surgery, the operation for the removal of stone from the bladder. When properly performed, the operation seldom requires more than three minutes, and in favorable cases the wound heals in the course of a month. See CALCULUS.

Lithuania, a region in eastern Europe, which formed a grand duchy in the eleventh century, became united to Poland in the fourteenth century and at the dismemberment of that kingdom was nearly all appropriated by Russia. The balance went to Prussia. The Lithuanians are fair-haired, blue-eyed and light-skinned; they are of mild disposition and are chiefly occupied in agriculture. Their language is akin to the Old Prussian and forms, with these, the Lithuanian, or Lettic, branch of the Aryan family of tongues. Their literature consists chiefly of popular songs and hymns, religious works and tales.

Litmus, a peculiar coloring matter, procured from lichens. Paper tinged blue by litmus is reddened by the feeblest acids and hence is used as a test for the presence of acids. Litmus paper which has been reddened by an acid will be turned blue again by an alkali. Hence the paper is indispensable in chemical laboratories, especially in all analyses.

Little Falls, MINN., the county-seat of Morrison co., 96 mi. n. w. of Minneapolis, on the Mississippi River and on the Northern Pacific railroad. The city is an important commercial center for a large agricultural and lumbering district. A dam across the river affords good water power and there are extensive manufactures of lumber, paper, flour, beer, agricultural implements and brick. The city has a fine courthouse, a public library, Saint Gabriel's Hospital, Saint Otto's Orphan Asylum and several good school buildings. Population in 1905, 5856.

Little Falls, N. Y., a city in Herkimer co., 21 mi. s. e. of Utica, on the Mohawk River and the Erie Canal and on the New York Central, the West Shore and other railroads. It is in a grazing region, and exports considerable dairy products. The river here flows through a rocky defile over many little falls and affords good water power for extensive manufactures. These include knit goods, paper, carriages, bicycles, leather, machinery, foundry and creamery products and other articles. The city has a public library, an excellent high school, a city

hospital and many fine church buildings. The place was settled about 1770. The settlement was destroyed by indians and Tories in 1782, but was rebuilt by a colony of Germans eight years later. It became a city in 1895. Population in 1905, 11,122.

Little Rock, ARK., the capital of the state and the county-seat of Pulaski co., situated in the geographical center of the state, about 130 mi. s. w. of Memphis, Tenn., on the Arkansas River and on the Chicago, Rock Island & Pacific, the Saint Louis Southwestern and two lines of the Saint Louis, Iron Mountain & Southern railroads. The city is built on a rocky bluff about 50 feet above the river. The new capitol is the most prominent building, and there are, besides this, the Federal buildings, a state arsenal and penitentiary, the county courthouse and various other fine buildings. The city contains the Marquand, supreme court, state and collegiate libraries. Among the educational institutions are the Philander Smith College, Arkansas Baptist College, Maddox Seminary, the Arkansas Military and other academies and state schools for the blind and deaf. The charitable institutions include a Confederate soldiers' home, a state asylum for the insane, the Saint Vincent's Infirmary, Jane Kellogg Home and the Methodist Orphanage. There are more than 70 churches, the most prominent of which are the Saint Andrews Cathedral and Christ Church.

Cotton is the principal agricultural product, and fruit growing, truck farming and coal mining are also carried on. There are various industrial establishments, including cottonseed oil mills, foundries and railroad shops, granite quarries, flour mills, brick and tile works and other manufactories. The place was settled in 1814 and was known as Little Rock, in contrast to Big Rock, one mile above the city, which is now the site of Fort Logan H. Roots. It was made the seat of the territorial government in 1820, was incorporated as a town five years later and was chartered in 1835. The place was captured by a Union army under General Steele, Sept. 10, 1863. Since about 1880 the growth has been constant and rapid. Population in 1900, 38,307; estimated in 1905 from the city directory at 65,000.

Liturgy, *lit'ur jy*, the form of worship in the celebration of the Lord's Supper, which is in general the same in all churches. The first part of the service consists of Scripture reading,

sermon and prayers; the second, of prayers and the offering of the consecrated bread and wine. The Book of Common Prayer contains the form of communion service used in the churches of the Anglican communion. The liturgies of the Eastern churches have been named the *Syrian rite*, still used by the Maronite Church of Mount Lebanon, in a Syriac version; the *Persian rite*, now used by the Nestorians; the *Byzantine rite*, used in many parts of the world and by the Greek and Russian churches; the *Egyptian rite*, a version of which is used by the Copts. The Western liturgies are the Roman mass, called the Latin liturgy, and that of Protestant churches, known as the vernacular, which grew out of the Reformation.

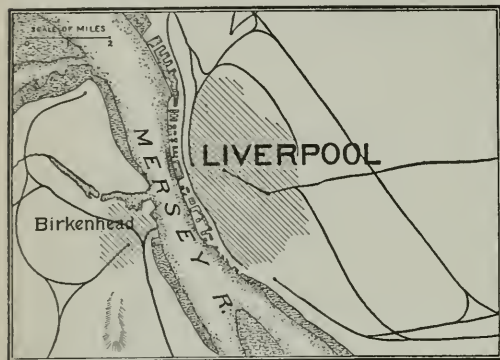
Liu-Chiu, Lu-Chu, Liu-Kiu, *lyoo kyoo*. See LOO-CHOO.

Live'-forever. See HOUSELEEK.

Liv'er, the gland which secretes bile. In man, the liver is situated just below the diaphragm, on the right side, extending across the middle line of the body toward the left. From its position it is liable to compression and injury. In its general form the liver is flat, broad and thick toward the right side, becoming narrow and thin toward the left. Its upper surface is convex or arched and fits into the concave surface of the diaphragm, while its lower surface is irregularly divided into lobes, five in number, separated by clefts, or fissures. In texture it is soft and easily crumbled. Its color is a dark reddish brown. The liver is supplied with blood by the hepatic artery. The portal vein carries to it the venous blood from the intestines, spleen and stomach, and after this blood circulates through the cells of the liver it is carried by the hepatic veins to the inferior vena cava. The bile secreted in the liver is carried by the hepatic duct to the gall bladder, a little pear-shaped sac on the under side of the liver, where it is stored when digestion is not going on; during digestion it is poured directly into the duodenum. See BILE; DIGESTION.

Liv'ermore, MARY ASHTON RICE (1821-1905), an American reformer, born in Boston. She early was active in the anti-slavery and temperance reform movements and during the Civil War gained special fame by her unselfish relief service for the Union soldiers. After the war she lectured upon moral and social problems, being a powerful advocate of temperance and woman suffrage. She was at one time editor of the *Woman's Journal* of Boston and was the author of numerous books.

Liv'erpool, the second city and seaport of England and the third city of the United Kingdom, situated on the river Mersey, 3 mi. from its mouth, $31\frac{1}{2}$ mi. s. e. of Manchester and 201 mi. n. w. of London. The city is built on a bend in the river, which gives it a semicircular water front between six and seven miles in extent. From this level the land rises gradually to an altitude of 250 feet. The main streets lead from the water front to different parts of the city. The newer and better part of the town is on the highland back from the river. Here are located some of the finest public buildings in the



world. Chief among these is Saint George's Hall, constructed from the profits arising from the docks, and used for various purposes. It contains a large audience room, which has one of the largest organs in the world; it also has other apartments used for public gatherings and educational purposes. Around this building or near by are located the free library, the Walker Fine Art Gallery and the Picton Lecture Hall, with a large reference library. The city maintains a large number of hospitals and other charitable institutions, designed to meet all the wants of its inhabitants. Nearly all of the public utilities, such as waterworks, lights, tramways or street cars, are owned and operated by the municipality.

Liverpool has a more extensive foreign commerce than any other port in the United Kingdom, and the docks, which extend along the river for nearly seven miles and contain over twenty-four miles of wharfage, are the chief objects of interest. Near the center of the line of docks is an immense floating dock, supported on pontoon boats. This is 2060 feet long and is connected with the mainland by eight bridges. Here most of the passenger steamers land. The docks have been constructed at great expense and include basins

which are enclosed by gates, so that vessels loading or unloading are not affected by the change of tide. Nearly all of the cotton, grain, dressed meat and other produce shipped from Australia, Canada and the United States to England enter through the port of Liverpool; likewise most of the exports from the United Kingdom to these countries leave from this port. Population in 1901, 684,947.

Liverworts, *liv'ur wurts*, a group of plants forming one of the two suborders of the *bryophytes*, the other including the mosses. Liverworts grow in various places, though they are commonly found in moist regions. One of the most common liverworts is the *marchantia*, which is always found in damp places. The species of another group live upon rocks and tree trunks and are often confused with delicate mosses, which they closely resemble.

Liv'ingston, MONT., the county-seat of Park co., 123 mi. s. e. of Helena and about 45 mi. n. of the Yellowstone Park, on the Yellowstone River and on the Northern Pacific and the Chicago, Burlington & Quincy railroads. The city is in a mining and lumbering section. It is a division headquarters of the Northern Pacific and has railroad shops and roundhouses. There are also lumber mills, lime works and an important trade in live stock, wool, mining tools, gold, coal and coke. The railroad passenger station is a fine building. Population in 1900, 2778.

Livingston, EDWARD (1764-1836), an American statesman, born in Clermont, N. Y. He graduated at Princeton in 1781, studied law, was admitted to the bar and soon attained eminence in his profession. He was sent to Congress from New York in 1794, serving until 1801. Later he became mayor of the city of New York, but through the dishonesty of others a shortage in his accounts developed; he resigned and went to the newly acquired Territory of Louisiana, where he built up a large practice. He was partly responsible for the law code adopted in the state in 1821, and he later prepared an elaborate code of criminal law, which has been adopted in part by many states and foreign countries. He served in Congress from 1822 to 1829, and was then elected United States senator. In 1831 he was secretary of state and in 1833 was minister to France, where he settled the claims of American citizens against France for depredations against American commerce.

Livingston, ROBERT R. (1746-1813), an American statesman, born in New York City, educated at King's College (now Columbia) and

admitted to the bar. He was appointed to a position in New York City under the British government, but lost his office through his radical patriotism, and was thereupon elected to the Continental Congress, where he was one of the committee appointed to draft the Declaration of Independence. Before the instrument was signed, however, he returned to New York State, where he assisted in drawing up a state constitution. He became chancellor under that constitution, holding the office until 1801. In that capacity he administered the oath of office to Washington as president. From 1781 to 1785 he had charge of the foreign relations of the Confederation and he was active in his support of the Federal Constitution in New York State. He was minister to France in 1801 and with James Monroe negotiated the purchase of Louisiana.

Livingstone, DAVID (1813-1873), a missionary and African traveler, born at Blantyre, in



DAVID LIVINGSTONE

Scotland. Under the auspices of the London Missionary Society he went in 1840 as medical missionary to South Africa, where he joined Robert Moffat. His first station was in the Bechuana territory, and here his labors were associated for nine years with Moffat, whose daughter he married. Having learned from the natives that there was a large lake north of the Kalahari Desert, he explored the region and discovered Lake Ngami. Three years later, in

1852, he undertook another expedition, exploring the upper lakes of the Zambezi River and arriving at Loanda, on the Atlantic coast, in 1854. Returning to Linyanti, he struck eastward from there in 1855, tracing the Zambezi to the Indian Ocean and thus crossing the entire continent. The record of this journey is found in his *Missionary Travels and Researches in South Africa*, published in London in 1857. In 1858 he was placed in command of an expedition for the exploration of eastern and central Africa, and during this expedition he discovered lakes Shirwa and Nyassa. Seven years later he started out to set at rest the question of the sources of the Nile, and from this time until his death he was engaged in laborious explorations in the lake region of South Africa, especially to the westward of Nyassa and Tanganyika, where he discovered lakes Moero and Bangweolo. For about three years no communication from him reached the outer world, and doubts regarding his safety were set at rest only when it was known that Henry M. Stanley, the correspondent of the *New York Herald*, had seen and assisted him at Ujiji, on Lake Tanganyika. They parted in March, 1872, Livingstone going to explore the southern end of Lake Tanganyika and Stanley proceeding to Zanzibar. Another year's hardships completely exhausted Livingstone, and he died in May, 1873, near Lake Bangweolo. His body was taken to England and was buried in Westminster Abbey. He was the author of *Missionary Travels and Researches in South Africa* and *The Zambesi and Its Tributaries*. Consult Stanley's *How I Found Livingstone* and Hughes's *David Livingstone*.

Livo'nia, GULF OF. See RIGA, GULF OF.

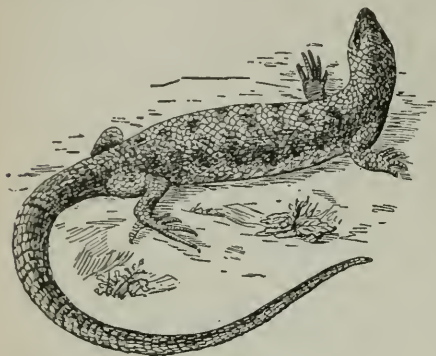
Livre, le'vr', an old French coin about equal in value to the franc, which superseded it in 1795. The livre was also an ancient unit of weight, equal to about $17\frac{1}{4}$ ounces avoirdupois.

Liv'y (59 B. C.-17 A. D.), Titus Livius, a celebrated Roman historian. Nothing is known of his life except that he was born at Patavium (Padua), that he came to Rome, secured the favor of Augustus and became a person of some consequence at court; that he was married and had at least two children, and that he died in his native town. His history of Rome consisted of 140 or 142 books, of which we have only the first ten. Of all the books except two, however, we possess short epitomes or tables of contents. Livy makes no pretensions to the character of a critical historian; his purpose was to glorify his country, and he adopted all the legends of the

Lizard

early history, without troubling his mind about their truthfulness.

Liz'ard is the popular English name of numerous reptiles, which have usually two pairs of limbs and a long body terminating in a tail.



LIZARD

The lizards number about two thousand species and accommodate themselves to all conditions except cold. In the tropics they are numerous and large. Some lizards feed on vegetables, but for the most part they live upon small birds and insects. Lizards lay their eggs in the sand and abandon them. The chief families of lizards are the skinks, the geckos, the iguanas and the chameleons. Poison glands are wanting in all lizards excepting in the Gila monster of Arizona and Mexico, which is capable of inflicting a dangerous bite. See **BASILISK**; **GILA MONSTER**; **HORNED TOAD**; **MONITOR**.

Llama, *lah'ma*, a cud-chewing animal, found in South America and closely allied to the camel. The llama has the general appearance of a long-necked sheep, standing about three feet at the shoulder. Of the four known species, the guanaco and the vicuña are found in a wild condition, while the llama and the alpaca have long been domesticated. The llama is used by the inhabitants of Chile and Peru to carry burdens after the manner of a camel. When loaded with a hundredweight it can travel about fourteen miles a day across the mountain passes.

Llanos, *lah'noze*, the Spanish name given to the vast plains situated in the northern part of South America, particularly in Colombia and the basin of the Orinoco. During the dry season the vegetation is burned up by the sun, while in the rainy period the llanos are flooded with water. Between these two seasons they are covered with thick grass and are ranged by vast herds of cattle and horses. Farther south, such plains

Lobelia

are called *pampas*, and in North America *savannas*. See **PLAIN**.

Lloyd's, a famous marine insurance association, whose headquarters are in the Royal Exchange at London. It derived its name from Lloyd's Coffee House, where the members were at first accustomed to meet. Members are admitted by subscription, and the affairs of the association are conducted through an executive committee. The society includes brokers, who enter ships for insurance; surveyors, who determine the desirability of the risk, and underwriters, who insure the vessel. It has agents in all important ocean ports of the world, from whom it receives reports, and it issues daily reports at the society's headquarters, containing much valuable information as to the condition of shipping. An annual publication, called *Lloyd's Register*, is also compiled. A similar society is the Austrian Lloyd's, with headquarters at Trieste. See **A 1**.

Load'stone. See **MAGNET**.

Loam, *lome*, a soil compounded of various earths, of which the chief are sand, clay and carbonate of lime or chalk, the clay predominating. Decayed vegetable and animal matter, in the form of humus, is often found in loams in



LLAMA

considerable quantities, and the soil is fertile in proportion. See **SOIL**.

Loanda, *lo ahn'dah*, **SAINT PAUL DE**. See **SAINT PAUL DE LOANDA**.

Lobe'lia, an extensive genus of beautiful herbs, which are natives of almost all parts of

the world and especially of the warmer portions of America. Several species grow wild in the United States. The most brilliant of these is the cardinal flower that forms so conspicuous a feature in the autumn swamps. A large, blue-flowered variety is almost as brilliant. Many tropical species are cultivated in hothouses because of their great beauty. All of the plants are more or less poisonous when eaten, and some are extremely so. Powerful drugs have been prepared from the juice of many species.

Lob'lolly Bay, the popular name of an elegant ornamental evergreen tree, common along the seashore of the southern United States. It has large and showy white flowers and grows to the height of fifty or sixty feet.

Loblolly Pine, an American pine, next to the white pine the loftiest in North America. Its leaves are six inches long, united in threes or fours. Its timber is of little value.

Lob'ster, the largest of the crustaceans, an animal very closely related to the common crayfish (See CRUSTACEA). The body has seven distinct segments, while the other thirteen, which form the thorax and head, are so blended together as not to be easily distinguished. The animal has two pairs of antennae and six pairs of mouth organs. The first pair of legs is long and terminates in large claws, one of which is thick and very heavy and is used for crushing objects. The other claw is shorter, smaller, more or less curved, toothed and pointed at the tip. It is borne on the large claw and so arranged that it can be used in fighting or to seize its prey. The tail is composed of the last segment and has two wide appendages on each side, making a broad incurved organ, which the animal uses



LOBSTER'S HEAD
Right gill covering removed to
show the gills

in swimming. By straightening this tail and drawing it forcibly under, the lobster is thrown backward through the water at a rapid rate. The lobster has two large, compound eyes, situated at the end of thick stocks. Its sense of smell is keen, as is its sense of hearing. The female carries her eggs on the under side of the abdomen until they hatch, when the young are driven away and for a time swim about freely near the surface. After about a month they descend to the bottom, where they remain. The

lobster lives on the bottom of the sea and rarely rises more than a few feet from it. It walks about on the tips of its legs, extending the large claws forward and pushing itself along by the swimming feet.

Lobsters are highly esteemed for food. They are caught in *pots*, which are traps made of wood, sunk among the rocks in the clear water in which the animals live. The pots have a funnel-shaped opening and are baited with fresh meat, which attracts the lobsters. When they have once entered the trap they are unable to escape. When taken from the water the lobster has a greenish appearance. The brilliant red color of those placed upon the market is produced by boiling.

Lob'worm, a worm with a round head and a body about the size of a large earthworm. It breathes through thirteen pairs of gill-tufts. The lobworm, or lugworm, is used for bait in deep sea fishing, and at low tide it may be found on every seabeach by the little coils of sand it leaves when burrowing.

Lo'cal Option, a term applied to the principle by which a certain majority of the inhabitants or taxpayers of a certain locality may decide as to whether liquor may be sold therein. This principle operates in several of the states of the Union and is being rapidly extended through the agitation of temperance organizations. See LICENSE.

Loch Lomond, *loK lo'mond*. See LOMOND, LOCH.

Lock, an arrangement for fastening doors, chests, drawers and the like. It is so made that it cannot be worked except by the key or knob especially fitted to it. The simplest lock contains a bolt, a staple into which the bolt locks, and a spring which prevents the bolt

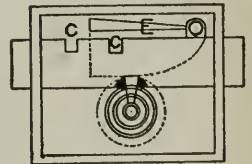


FIG. 1

from being moved without the key. The bolt has a rounded notch on the under side, into which the key fits. On the upper side are two square notches, *CC*, which are as far apart as the bolt moves. Back of the bolt and fastened to the frame by a pivot, is a tumbler, indicated by the dotted lines in Fig. 1. On the end of the tumbler is a square piece of metal, *E*, which drops into the notches, *CC*, as the bolt is locked or unlocked. This plug is pressed down upon the bolt by a spring attached to the frame and the other side of the bolt. The

whole arrangement is enclosed in an iron frame. On the inside of the frame are curved ridges, called *wards*. Slots are cut into the key so as exactly to fit these wards, and by this arrangement each lock is protected so that it cannot be opened or closed by any key but the one made specially for it. In Fig. 2 is shown a lock with a

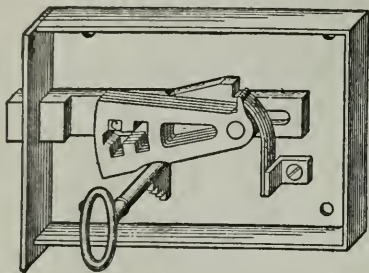


FIG. 2

number of tumblers, which make it more complicated and more difficult to be opened with any key except its own. Formerly locks of this pattern were in general use on stores and other public buildings, but they have now been almost entirely replaced by the Yale lock, named from its inventor, Linus Yale. This has a flat key with notches on one edge, which fit a number of pin tumblers that move up and down. It is practically impossible to open this lock with any key except the one designed for it.

Lock, in engineering, a device in a canal for raising or lowering boats from one level to another. A lock is a chamber whose side walls are made of stone or concrete and whose ends are closed by a pair of folding gates. The gates in each pair are called *leaves*. Each leaf turns on an upright post, called the *quoin* post. When closed, the leaves form a V-shaped partition across the chamber, with the vertex pointing up stream. This enables the gates to withstand the pressure of the water in the lock. When a boat is to be locked from a lower to a higher level, the gates at the upper end of the chamber are closed and those at the lower end are opened. This leaves the water in the chamber at the same level as that in the lower level of the canal. The boat passes into the chamber, and the lower gates are closed. By means of valves in the gates at the upper end or in the sides or bottom of the chamber, the water is gradually let into the lock until the boat is raised to the upper level of the canal. The gates at the upper end of the lock are then opened and the boat passes out. When the boat is lowered, the operations are reversed. In

large locks the gates and valves are operated by machinery. See CANAL.

Locke, DAVID ROSS (1833-1888), an American journalist and humorist, born in New York State. He learned the printer's trade and was connected with several newspapers. He became famous for his political satires, published under the name of Petroleum Vesuvius Nasby.

Locke, JOHN (1632-1704), one of the most influential of English philosophers, born at Wrington, in Somersetshire. He was educated at Westminster School and Christ Church College, Oxford, after which he applied himself to the study of medicine. Later he became secretary to the earl of Shaftesbury and was assigned the task of drawing up a constitution for the Carolinas, of which the earl was one of the proprietors. His attempt, known as the Grand Model, was a failure, because it was based upon a feudal aristocracy, which was wholly impracticable in a new country. Later he published his *Essay Concerning Human Understanding*, a work which attracted wide attention and at once gave him a place among the foremost thinkers of his time.

Locke's essay is essentially an inquiry into the nature and limits of human thought processes. He maintains that there are no innate ideas and that at birth the mind is as a tablet of blank white paper (*tabula rasa*), whereon experience is to write ideas. He asserts that all experience can be resolved into sensation and reflection, that is, into the impressions that external objects make upon the mind through the avenues of the senses and the perceptions of the operations of the mind in disposing of sensations, and therefore external objects and reflection upon mental processes, such as reasoning, willing, believing and other similar operations, constitute the sources of all knowledge. These views were revolutionizing in their tendency and profoundly affected the educational thought of the time. Besides his essay on the understanding, Locke's other important works are *Of Civil Government*, *Reasonableness of Christianity* and *Thoughts Concerning Education*.

Lockhart, JOHN GIBSON (1794-1854), a Scotch author and editor. He was educated at the University of Glasgow and at Balliol College, Oxford; studied for the Scottish bar, but never practiced, and began his literary career in 1817, as a contributor to the newly established *Blackwood's Magazine*. In 1820 he married the daughter of Sir Walter Scott, and in 1825 he succeeded Mr. Gifford as editor of the *Quarterly*

Lockhaven

Review. He wrote several novels, a *Life of Burns*, a *History of Napoleon* and a *Life of Scott*. The last is his greatest work, and with the exception of Boswell's *Johnson* it is the best biography in English.

Lockha'ven, PA., the county-seat of Clinton co., 68 mi. n. w. of Harrisburg, on the west branch of the Susquehanna River and on the New York Central and the Pennsylvania railroads. The city is in an agricultural and lumbering region and contains planing mills, foundries, tanneries, brick and sewer-pipe works, silk mills and manufactories of paper, cigars and other articles. One of the state normal schools is located here, and the city has a fine courthouse, a hospital and a subscription library. The place was settled in 1769 and was incorporated as a city in 1870. Population in 1900, 7210.

Lock'jaw. See TETANUS.

Lock'port, N. Y., the county-seat of Niagara co., 26 mi. n. e. of Buffalo, on the Erie Canal and on the New York Central and the Erie railroads. The canal here has a series of five locks, with a lift of 12 feet each, and affords good water power. Near the city are extensive quarries of limestone and sandstone, and the principal manufactures are waterworks machinery, milling and wood-working machinery, pulp, paper, glass, brooms and cereals. The city has a large trade in grain and fruits from the surrounding agricultural region. The prominent buildings are the high school, the Federal building and the courthouse. Saint Joseph's Academy is located here, and there are good public and parish schools. The place was settled in 1823 by workmen on the Erie Canal. It was incorporated in 1829 and was chartered as a city in 1865. Population in 1905, 17,552.

Lock'wood, BELVA ANN BENNETT (1830-), an American lawyer and reformer, born at Royalton, N. Y. She graduated at Genesee College, Lima, N. Y., taught school for some years, afterward studied law and was admitted to the bar in Washington in 1873. After laboring for the passage of a law admitting women to practice before the Supreme Court, she was admitted to that practice and acquired some reputation. She was afterward conspicuous in the agitation for woman suffrage, temperance and world peace. She was twice married, the second time to Dr. Ezekiel Lockwood.

Lo'co-fo'co, a name given to a faction of the Democratic party in New York State in 1835, which demanded the rechartering of the United

Locomotive

States bank and was opposed to the chartering of state and private banks by special legislation. The faction received its name from an occurrence at a mass meeting held at Tammany Hall, New York, in October, 1835. The organization Democrats attempted to control the meeting, but being unsuccessful, they turned out the lights and retired. The victors, however, had supplied themselves with friction matches, which were at the time called *loco-focos*, and, lighting candles, proceeded to transact their business. The regular Democratic press soon took up the incident and dubbed the faction *loco-focos*. Eventually the Whigs applied this name to the Democratic party throughout the country. The faction was finally absorbed into the original organization, through the efforts of President Van Buren.

Locomo'tive, in the ordinary meaning of the term, a steam engine used to haul cars upon a railway track, but in its broadest sense, any self-propelling engine. Those operated by other than steam power are known as electric locomotives and compressed air locomotives. Those used upon roads and farms are called traction engines (See TRACTION ENGINE). The first successful attempt to construct a self-propelling engine was by a Frenchman named Cugnot in 1796, but the railway locomotive was invented by Richard Trevithick, a Cornish miner, in 1804. While this locomotive was considered a failure commercially, it contained most of the important features successfully used in later patterns. The success of the locomotive is due to George Stephenson, an English engineer (See STEPHENSON, GEORGE). In 1829, at a competitive trial of several locomotives on the Liverpool & Manchester railway, Stephenson's engine, the *Rocket*, was the most successful, and many others were patterned after it. This engine was mounted on four wheels, and had a horizontal boiler 6 feet in length and 5 feet 4 inches in diameter, which contained 25 tubes, each 3 inches in diameter. The cylinders were placed at the rear end of the boiler, just over the fire box, and exhaust pipes led from them to the smokestack. The drive wheels were in front and were connected directly with the piston by connecting rods. When ready for use this engine weighed $4\frac{1}{2}$ tons, and with the tender, $7\frac{1}{2}$ tons. On its trial trip it hauled a load weighing over nine tons at a speed of 15 miles per hour, and on another trip it reached a speed of nearly 30 miles per hour. The success of this locomotive demonstrated the practicability of steam power for railways.

Locomotive

The first locomotives used in the United States were imported from England, but in 1830 one was built at the West Point foundry, and others soon followed. The early American engines copied the English patterns very closely, but the conditions to be met upon American railways made it necessary to deviate from the English type, and soon a distinct type of American locomotive was developed, which, with various modifications and enlargements necessary to meet the constantly growing traffic, is still in general use.

A locomotive consists of a steam boiler of the tubular type (See **BOILER**), a pair of simple or compound engines, a running gear and a wrought iron frame, on which the various parts are so mounted that the engine can travel upon a track. The accessory parts are the *smokestack*, or *chimney*; the *pilot*, for knocking objects off the track; the *cab*, for sheltering the enginemen; the *tender*, for carrying fuel and water; the *injector*, for forcing water into the boiler; the *air brake pump* and necessary appliances; the *sand dome*, the *bell*, the *whistle*, *steam gauges*, *water gauges* and the *safety valve*.

The most common type of American locomotive has a horizontal boiler; four drive wheels, from four feet five inches to six feet five inches in diameter, and connected on each side of the engine by a bar joined to the pistons by connecting rods. The forward end of the machine rests upon a truck, or bogie, of four wheels, and the tender usually has eight wheels arranged in two trucks. Locomotives intended for hauling freight trains may have as many as eight, or even ten, drive wheels. The wheels of these locomotives are smaller than those of passenger locomotives, since in the freight engine great traction power is desired, while speed is not as essential. Some passenger engines, especially those designed for heavy grades, have six drive wheels, and if the engine is designed for high speed, the wheels are six or more feet in diameter. Every device for controlling the locomotive is within easy reach of the engineer, so that by pulling a lever, he opens the throttle valve and lets on the steam, or by pushing it from him, he closes the valve and shuts off the steam. A lever, connected with a link in which the valves work, can be moved forward or backward, and by moving it the engine is reversed and will run as well in one direction as in the other.

The weight of passenger locomotives ranges from 60 to 70 tons, in the older patterns, to as high as 125 and even 140 tons, in the newer patterns, while the largest freight engines weigh

Locust

nearly 200 tons. The largest locomotive works in the United States are the Baldwin Locomotive Works at Philadelphia. Others of importance are the Rogers Locomotive Works at Paterson, N. J., and the works of the American Locomotive Company, which are located in eight different cities. The total capacity of these works is about 3100 locomotives a year. Of this number 600 are exported to foreign countries, exclusive of Canada and Mexico. The American locomotive is now found on every continent. See **RAILROAD**; **STEAM ENGINE**.

Locomoto'or Ataxia, a disease of the nervous system, characterized by a loss of the power to move the muscles harmoniously. It is not paralysis, for the person is able to move and even to walk, though with a peculiar halting gait, during which he often falls, because the limbs will not move together. The approach of the disease is slow and long continued, and is often accompanied by partial paralysis. The disease usually continues to a fatal termination, though it is sometimes stopped if treatment is begun in the earlier stages.

Lo'cust, the name rather loosely applied to several insects of different genera. In the



LOCUST

United States, the cicada, or harvest fly, is called a locust, while the real locust of this country is known as the red-legged grasshopper (See **CICADA**; **GRASSHOPPER**). The hind legs of the locusts are large and powerful, so that they have great power of leaping, but their antennae are short, and they differ also from katydids or true grasshoppers in their peculiar notes, which are made by rubbing their hind legs on their wing covers. The Rocky Mountain locust breeds west of the Mississippi River and east of the Rocky Mountains, selecting places along river bottoms or in grassy places of the mountains in the northern part of the region mentioned. The female lays twenty-five or more eggs, cementing them carefully together and covering them with a case, or cocoon, which she buries in the sand. From the first, the young resemble their parent, and after frequent molting they reach their full size in about seven weeks. On reaching matu-

they gather in flocks and begin incredibly long migrations, with an apparent definiteness of purpose and regularity of movement that no other insect ever shows. Sometimes they appear in such vast numbers as almost to obscure the light of the sun; toward night or on cloudy days they settle down on the earth and devour everything green they can find. Sometimes within a few hours whole acres of flourishing vegetation have been destroyed. In 1874 the locusts overran the whole territory west of the Mississippi, and it is estimated that \$50,000,000 would not cover the damage they did. The next year 750,000 people were made destitute or suffered severely in Kansas, Nebraska and Missouri. Since that time, though there have been numerous flights of locusts, they have not appeared in such destructive numbers, and it is thought that the cultivation of the land and the destruction of their breeding places has prevented anything of the kind in the future. Migratory locusts are found also in Asia and Africa, where their flights have been as destructive as those of the locusts in this country. Arabs and other natives of the East frequently use the dried insects as food.

Locust, a well-known tree of the United States, with delicate leaves and drooping clusters of white, heavily scented flowers, shaped like pea blossoms. From the tall trunk a hard, durable wood is obtained and used for cog wheels and special purposes in cabinetmaking and shipbuilding. The locust grows best in Kentucky and Tennessee, but as it spreads rapidly and is subject to insect pests, it is losing its popularity.

Lodge, *loj*, HENRY CABOT (1850-), an American statesman and writer, born at Boston, educated at Harvard University and admitted to the bar in 1876. While attaining eminence in his profession, he also wrote many books upon historical and legal subjects, notably *A Short History of the English Colonies in America* and biographies of Daniel Webster, Alexander Hamilton and George Washington. He was elected to Congress in 1887, served three terms and was then elected United States senator. He was reelected in 1899 and 1905.

Lodi, *lo'de*, a city of Italy, in the Province of Milan, on the Adda River, 20 mi. s. e. of Milan. Its chief buildings are a cathedral, which dates from the twelfth century, and the Renaissance Church of the Incoronata. Linen and woolen goods and silk are manufactured, but the most important industry of the city and the surround-

ing district is the manufacture of cheese. In May, 1796, Napoleon defeated the Austrians at Lodi. Population in 1901, 20,730.

Lodz, *loje*, a town in Russian Poland, in the Government of Piotrkow, 75 mi. w. s. w. of Warsaw, and next to it, the most populous town in Russian Poland. It has extensive trade and manufactures, especially in woolens and cottons, and is, in fact, one of the important cotton manufacturing cities of the world. Population in 1900, 351,570.

Loeb, *lob*, JACQUES (1859-), a German-American biologist. He was educated at Berlin, Munich and Strassburg and became assistant professor of physiology at the University of Würzburg in 1886; two years later he was given a similar position in the University of Strassburg. In 1891 he came to America, to accept an appointment as associate professor of biology at Bryn Mawr College, and in the following year he was called to the University of Chicago. In 1902 he became professor of physiology in the University of California. Professor Loeb specialized in comparative physiology, becoming famous for ingenious experiments upon the subject of reflex action in lower animals, for his researches in the composition of protoplasm and especially for showing the effect of salt solutions on muscles of the heart.

Loess, *löss*, a sandy deposit of the early part of the Quaternary era. It consists of a fine, porous, siliceous silt, containing more or less carbonate of lime, that collects in nodules or tubules which take a vertical position. It was first described from deposits in the Rhine Valley, but it is found in large quantities in all parts of the world. Where the deposits are cut by rivers, they often form bluffs like those along the Mississippi, in some of which the formation exceeds 250 feet in depth. When charged with humus, loess forms excellent soil, but on account of its sandy nature it requires more rainfall than loam (See SOIL). There are numerous theories concerning the formation of loess. Some geologists consider that the deposits on the Great Plains are the bed of a lake which existed during the close of the Glacial period. The deposits along rivers were probably formed by running water, and wind has undoubtedly contributed to the formation of other deposits. See GLACIAL PERIOD; QUATERNARY PERIOD.

Lofoten or **Lofođen**, a group of islands off the northwest coast of Norway, measuring about 165 miles in length. The chief islands are Andö, Langö, Hindö, East and West Vaagö,

Log

Moskenäsö and Flakstadö. Most of them are rugged and precipitous, and several of them have mountains. They are for the most part unfer- tile, though there are some regions which are productive. The Lofoten Islands are especially noted for being the richest fishing grounds in the world. The cod and herring fisheries are especially important and are the chief source of national wealth. About 30,000 fishermen are engaged around the islands. In some places the navigation, even for schooners, is very diffi- cult, because of the tidal currents and the narrow channels between the islands, and near the south end of the group is the whirlpool called Malström. Population in 1900, 42,817.

Log, a contrivance used in measuring the rate at which a ship travels through the water. The *common log* is a piece of thin board, form- ing the quadrant of a circle of about six inches radius, so balanced as to float perpendicularly in the water, with the greater part immersed. One end of the *log-line* is fastened to the log, while the other is wound round a reel. The log is thrown out and the length of line unwound in a given time gives the rate of the ship's sailing. This is calculated by knots made on the line at certain distances, while the time is measured by a sandglass running a certain number of seconds.

Lo'gan, UTAH, the county-seat of Cache co., 70 mi. n. of Salt Lake City, on the Logan River and on the Oregon Short Line railroad. The city is in an agricultural and stock-raising dis- trict and has flour, lumber and woolen mills, breweries and sugar factories. The state agri- cultural college, Brigham Young College and the New Jersey Academy are located here. Lo- gan was settled in 1859 and was incorporated in 1866. Population in 1900, 5451.

Logan, JOHN ALEXANDER (1826-1886), an American soldier and statesman, born in Jackson County, Ill. He served in the Mexican War with credit and at its close entered college, graduating from Louisville University in 1852. He was then elected to the state legislature sev- eral times, and in 1858 he was sent to Congress, as a Democrat, being reelected after his first term. He resigned to enter the army. He was made colonel of an Illinois regiment, fought at Belmont, Fort Henry and Fort Donelson, and became brigadier general, later major general of volunteers. Logan participated in the Vicks- burg campaign and was with Sherman in his march toward Atlanta, taking a conspicuous part in the Battle of Kenesaw Mountain and being twice placed at the head of the Army of

Logarithm

the Tennessee. In 1866 he was reelected to Congress, where he served until 1871. He was one of the managers of Johnson's impeachment trial. He became United States senator, but in 1877 resumed the practice of law, in Chicago; shortly afterward he returned to the Senate,



JOHN A. LOGAN

where he won a reputation as a forceful and eloquent orator. In 1884 he was a leading candidate for the Republican nomination for president, but being defeated, was made the candidate for vice-president. Later he was again returned to the Senate and died in office. He was the author of the *Great Conspiracy* and *The Volunteer Soldier of America*. Consult Dawson's *Life and Services of John A. Logan*.

Lo'gansport, IND., county-seat of Cass co., 72 mi. n. of Indianapolis, at the confluence of the Wabash and Eel rivers and on the Pittsburg, Cincinnati, Chicago & Saint Louis, the Vanda- lia and the Wabash railroads. The city has good water power and a supply of natural gas; and the industrial establishments are railroad shops and manufactures of automobiles, motors, lumber, carriages, lime, cement and other goods. The Northern Indiana Hospital for the Insane has its buildings here. The city has a fine courthouse, a Carnegie library, the Holy Angels' Academy, a business college and public high and parish schools. Logansport was first incor- porated in 1838. Population in 1900, 16,204.

Log'arithm, the index of the power to which a constant number, called the base, must be

Logarithm

raised to equal a given number. The base most commonly used is 10. Thus, 10^3 equals 1000, and the logarithm of 1000 (generally written $\log 1000$) is 3; $10^{2.9222}$ equals 836; the logarithm of 836 is therefore 2.9222. According to the same principle the following expressions are derived:

$\log .001 = -3$	$\log 10 = 1$
$\log .01 = -2$	$\log 100 = 2$
$\log .1 = -1$	$\log 1000 = 3$
$\log 1 = 0$	$\log 10,000 = 4$

From this table it is evident that the logarithm of any number greater than 1 and less than 10 is fractional; the logarithm of any number greater than 10 and less than 100 is greater than 1 and less than 2; the logarithm of any number less than 1 is negative. In the expression 2.9222, which is the logarithm of 836, the integer 2 is known as the *characteristic*; the decimal is known as the *mantissa*. According to the common system, the mantissas in logarithms of all numbers having the same sequence of figures are the same; thus, $\log .008$ equals 3.9031; $\log 8$ equals .9031; $\log 800$ equals 2.9031. This fact, together with the rules developed above for the formation of logarithms, make it unnecessary to place characteristics in the table of logarithms. Thus, to find the logarithm of the number 18.1 in a book of logarithmic tables, we find opposite 181 the mantissa .257679. Now 18.1 is greater than 10 and less than 100; so, according to the rule given above, its logarithm is greater than 1 and less than 2. Hence, if its mantissa is .257679 its characteristic must be 1. Therefore, the $\log 18.1$ equals 1.257679. The characteristic of the logarithm is always equal to one less than the number of places to the left of the decimal point in its corresponding number (See example given above).

Since the logarithm is an exponent of the power of the base, in performing the fundamental calculations with logarithms the same rules are followed as in algebra. In the example $A^3 \times A^4 = A^7$ ($3+4$), if A is the base of a system of logarithms, 3 and 4 represent the logarithms of two numbers, respectively, and A^3 and A^4 represent those numbers. The expression $A^3 \times A^4$ then represents a process of multiplication. As in algebra we add the exponents to obtain the products of the quantities, so in using logarithms we add the logarithms to obtain the logarithm of the product of the numbers represented by them. In division, one logarithm is subtracted from the other to obtain the logarithm

Logwood

of the quotient. To obtain the logarithm of the square root of a quantity we divide the logarithm of the given number by the number denoting the root to be extracted. In raising a number to the given power we multiply the logarithm of that number by the number denoting the power to which it is to be raised.

Log Book, a book into which the direction of the wind, the course of the ship, the state of the weather at all hours of the day, are daily transcribed at noon, together with every circumstance deserving of notice that may happen to a ship or within her knowledge, either at sea or in a harbor. In the United States navy the record is filled out and signed every day, and when the book is full it is filed among the records of the navy department.

Loggia, *lod'jah*, a word used with several significations. It is applied to a hall open on two or more sides, where there are pillars to support the roof, such as the Loggia de Lanzi in Florence; to an open colonnade, or arcade, surrounding a court, and to an open gallery at the height of one or more stories in a building. The term is also used to designate a large ornamental window, consisting of several parts, often seen in old Venetian palaces; or a small airy hall, usually open on all sides, constructed on the roof of an edifice.

Logic, *loj'ik*, the science of reasoning. Aristotle was the first to set forth the science of logic in a formal manner, and the principles and laws which he established are still recognized. Aristotle's system proceeded from general truths to particular facts by a process of reasoning illustrated in the syllogism (See SYLLOGISM); in method his logic was deductive (See DEDUCTIVE METHOD). A later system, founded by John Stuart Mill, begins with particular facts and proceeds to general truths. This is known as the *inductive system*. See INDUCTION; INDUCTIVE METHOD.

Log'wood, the common name of a tree which grows in moist and swampy places in Central America and on the eastern shores of Mexico, and which has now become naturalized in many of the West Indian islands. The wood, which is red, tinged with orange and black, is so heavy as to sink in water, and it takes a fine polish. The use of logwood, however, is chiefly as a dye wood. The best dyes are obtained from the trees around the Bay of Campeachy. Here, when the trees have grown to a height of from twenty to fifty feet, they are cut down, the heartwood is trimmed out, cut up into short logs and

then hewn and ground into little chips. From these the color is extracted by water; it is afterward purified and varied by chemicals to such



LOGWOOD

an extent that red, purple, black, violet, lilac, blue and green may all be obtained. An extract of logwood is used as a medicine.

Lohengrin, *lo en grin'*, the hero of a German poem of the end of the thirteenth century, represented as the son of Parsifal and one of the guardians of the Holy Grail. Sent by King Arthur to help the Princess Elsa of Brabant, he arrives in a vehicle drawn by a swan, delivers the princess from captivity and marries her. He accompanies the emperor in a campaign against the Hungarians and fights against the Saracens. He then returns to his bride at Cologne, but being pressed by her to state his origin, he is prevailed upon to tell it, after which he must, by the terms of his vow, return home to the Grail. The legend has been made the subject of a well-known opera by Wagner.

Loire, *lwahr*, (ancient Liger), the longest river in France, which rises in the Cevennes, flows first in a northerly, then in a westerly, direction and empties into the Bay of Biscay. Its whole course is over 620 miles, of which about 490 miles are navigable.

Lok or **Loki**, *lo'ke*, in Northern mythology, the wicked deity, the father of Hel, goddess of the dead. Although regarded as the personification of evil, he was described as of handsome appearance and well able to fascinate when he chose. His ingenuity far surpassed that of any of the other gods, and when he could, at times, be compelled to exercise it in behalf of the other gods, the results were most beneficial. Ordinarily, however, he was occupied with the most evil plotting, partly from a spirit of mischief and partly from pure wickedness.

Lol'lards, a name applied as a term of contempt to various sects or fraternities deemed heretical. It became well known in England about the end of the fourteenth century, when it was applied to the followers of Wycliffe and to others more or less influenced by his teaching. Later the Lollards drew upon themselves the enmity of the civil powers, and numbers of them were put to death, especially during the reign of Henry V.

Lombards (so called either from the long *barte*, or spear, which they carried, or from the long beards they wore), a Germanic, or Teutonic, people who at the beginning of the Christian era were dwelling on the Lower Elbe. They make little appearance in history till the sixth century, when, under their king, Alboin, they entered Italy in 568, and conquered the northern portion, which hence received the name of Lombardy. Authari, a successor of Alboin, married Theodelinde, a Frankish princess, who began the process of converting the Lombards to the orthodox faith. The only king of note among the successors of her family was Rothari, who in 643 promulgated a system of laws, which, with subsequent additions, became among German jurists the basis of the study of law during the Middle Ages. From 713 to 744 the Lombards had a powerful king in the person of Liutprant, who extended his sway, at least temporarily, over the whole of Italy. From that time the power of the Lombards gradually declined, and finally Charlemagne captured Pavia, after a six months' siege, and put an end to the Lombard kingdom (773 or 774).

Lombardy, *lom'burd y*, the part of Upper Italy which took its name from the Lombards, who invaded and conquered it in the sixth century. The Lombard kingdom was overthrown by Charlemagne. Lombardy was formerly the name of an Italian department embracing what now constitutes eight provinces, Bergamo, Brescia, Como, Cremona, Mantua, Milan, Pavia and

Lombok

Sondrio, and containing an area of 9374 square miles. Population in 1901, 4,282,728.

Lom'bok, an island in the Indian Archipelago, belonging to the Dutch. It lies between Bali on the west and Sumbawa on the east and has an estimated area of 2100 square miles. Rice, corn, tobacco and sugar are raised, and cattle, horses and buffaloes are exported. Brahmans are the ruling class, but the mass of the population is Mohammedan. The capital is Mataram,

London

50 miles from its mouth. This latter fact has given London many of the advantages of a city on the coast. London south of the river, which is the less important part of it, lies in the counties of Surrey and Kent; the portion north of the river is in the county of Middlesex. The commercial and money-making parts of London are in the East End. Here are the port, the docks, the customhouse, the bank, the general postoffice and many public buildings, besides the



1, Houses of Parliament; 2, Westminster Abbey; 3, Buckingham Palace; 4, Saint James Palace; 5, Albert Memorial; 6, Natural History Museum; 7, South Kensington Museum; 8, Zoological Gardens; 9, British Museum; 10, Saint Paul's Cathedral; 11, Bank of England; 12, Tower of London; 13, Greenwich Observatory.

on the west coast. Population, estimated at 325,000.

Lo'mond, Loch, the largest lake in Scotland. It is situated in the counties of Dumbarton and Stirling and is 23 miles in length and from 1 to 5 miles in width. The region around here is especially famous for its beautiful and picturesque scenery.

London, *lun'don*, the largest city in the world, the capital of the British Empire, is located in the southeastern part of England on the Thames River, which runs through the city from east to west. The Thames is about 230 miles in length and is navigable by sea-going vessels for

great Saint Paul's Cathedral. That part of London which lies west of the Temple contains the Houses of Parliament, Westminster Abbey, the royal palaces, the government offices, the British Museum, picture galleries and the residences of the aristocracy and wealthy citizens. London, as it was politically organized in 1888, is about 16 miles long and about 10 miles wide, covering an area of about 117 square miles. Outside these limits, however, is a wide area extending about 15 miles in every direction from Charing Cross, the official center of the metropolis, and embracing the metropolitan and city police districts. The area of this Greater London

is about 700 square miles. The city of London proper, or "the city," is a separate municipality, having a civic corporation of its own, at the head of which is the lord mayor of London. The city in this sense covers only 668 acres, and the resident population in 1901 was about 37,000.

London is not a beautiful city, although it has many magnificent buildings and some fine streets. It is on low ground, and from no one place can a general view of the city be obtained. The business portions are densely crowded, the streets are narrow and crooked, and the fogs and smoke have rendered the buildings dingy and unattractive in appearance. London east of the city proper is one of the most densely crowded and poorest places on earth. Poverty and disease make the death rate of this section one of the highest known. In striking contrast to this are the homes of the lower middle classes, to the north of the city, where, in cheap and neat houses, hundreds of thousands dwell in comfort, and the other thousands of luxurious homes of the wealthy middle class and the aristocracy, far out to the west. London is practical and commercial, and the city has grown because of its business importance, a fact which accounts to a great extent for the crudity of its plan and the oppressiveness of its general appearance. Communication between different parts of the city is effected by cabs, tramway cars, omnibus lines, street railways and steamboats, which ply regularly along the Thames. Elaborate systems of underground railways connect different parts of the city and join the terminal stations of the great railways. In order to dispose of the soil taken from the underground tunnels, or tubes, without detriment to the streets, it has been necessary to put them at a great depth and to work from the ends of the route into the city. American capital has been largely interested in these projects and has gradually obtained control of them. Yet the problem of rapid transit within the city has not been satisfactorily settled, for it is a tremendous task to move the millions of people whom business requires to travel about from day to day. London has excellent communication with all parts of the United Kingdom and with the outside world through the Thames River and the numerous railways, several of which have elegant stations at their terminals. The river is spanned by a number of broad, expensive bridges, some of which have been constructed on the site of other structures erected hundreds of years ago, and all of which are so arranged as not to interfere with navigation.

STREETS AND PARKS. Among the noted streets which run from east to west are Piccadilly and Pall Mall; the Strand and its continuation, Fleet Street; Oxford Street and its continuations, Holburn, Holborn Viaduct and Cheapside. The Thames Embankment, otherwise known as the Victoria Embankment, which runs along the north shore of the river from the Houses of Parliament east, is a magnificent thoroughfare, adorned by important buildings and ornamented with parks and statuary. The river is held in control by a solid granite embankment, through which, at intervals, steps give access to the steamers. Hyde Park, containing about 400 acres, is surrounded by a carriage drive $2\frac{1}{2}$ miles long. This is the most fashionable of the royal parks and, together with Regent's Park, Saint James's Park and Green Park, is located in the West End. Regent's Park, to the northwest, contains the gardens of the Zoölogical Society, with the largest collection of animals in the world, and the gardens of the Royal Botanic Society. Other parks are located in different parts of the city, and more are being provided for as places of rest and recreation for the crowded inhabitants. On the southern side of the city is Greenwich Park, naturally one of the most beautiful, and famous as being the location of the Greenwich Observatory. More characteristic of London than its formal parks are the heaths, or commons, which are preserved nearly in their natural condition for the use of the people. Hampstead Heath, to the north, and Black Heath and Plumstead Common, on the southeast, are the largest.

PUBLIC BUILDINGS, MONUMENTS AND INSTITUTIONS. Saint James's Palace, erected by Henry VIII; Buckingham Palace, built by George IV; Marlborough House; Kensington Palace, the birthplace of Queen Victoria, and others are among the royal palaces which grace the city. The imposing Houses of Parliament stand on the north bank of the Thames, in the West End. The Tower of London is farther east on the same side of the river (See TOWER OF LONDON). The Bank of England; the Royal Exchange; the Mansion House, which is the official residence of the lord mayor; Guild Hall, the seat of municipal government, and the four Inns of Court are noteworthy buildings. The new Law Court is one of the most important of recent public structures. Saint Paul's Cathedral, completed in 1710 by Sir Christopher Wren, is a magnificent building, 510 feet in length, with a great dome 400 feet in height, the most conspicu-

London

ous of London's buildings. Westminster Abbey adjoins the Houses of Parliament (See WESTMINSTER ABBEY). London is noted for its museums and galleries (See BRITISH MUSEUM). The South Kensington Museum occupies a capacious series of buildings which contain valuable collections in science and the fine arts, and the natural history department of the British Museum is located in an elegant building at South Kensington.

Notwithstanding its fogs and dirt, London is, taken as a whole, one of the healthiest cities in the world, and its public and charitable institutions are numerous. Hospitals and institutions for the care of the defective classes are well managed, and in recent years charitable work has been carried on extensively among the poorer classes.

On Fish Street Hill is a monument 202 feet high, erected in commemoration of the great fire of London; in Waterloo Place is the York Column, and in Trafalgar Square, the beautiful Nelson Column, at the base of which are the four famous bronze lions, the work of Sir Edwin Landseer. On the Thames Embankment is Cleopatra's Needle, a granite obelisk, companion to the one in Paris, that was brought to Europe from Egypt. Elsewhere in the city are many beautiful monuments and statues (See ALBERT MEMORIAL).

GOVERNMENT. In 1900 the government of that portion of the city outside of London proper was very much simplified by consolidation; the more than 500 public bodies, with a membership of over 10,000, ceased to exist, and the whole territory was divided into 28 boroughs, or municipalities, governed by councils. Each council has a mayor, not more than 10 aldermen and 60 councilors. One-third of the councilors may be elected each year, or all of them every three years. The system of taxation was also very much simplified. The metropolitan police is not a municipal organization, but is administered by the government. It is a large force, whose central offices are New Scotland Yard, a massive building near Westminster Bridge. The postal authorities divide Greater London into districts, designated as E. C. (East Central), W. C. (West Central), etc.

COMMERCE AND INDUSTRY. The commerce of London is enormous. Besides that which is transacted over the railways from the ports Southampton and Liverpool, and the internal commerce with the other cities of Great Britain, there is an enormous tonnage from all parts of

London

the world coming to the docks, which extend along the river from London Bridge eastward. London is the great port for the produce of the East and West Indies. Tea, sugar, tobacco, wine, tallow, hides and drugs are among the most important imports, and all these form large items. The value of the imports is estimated at more than one-third that for the entire United Kingdom. The manufactories of London are almost limitless in number and capacity. The largest breweries and sugar refineries in the Kingdom are located here; extensive chemical works, soap manufactories and dye works are also to be found; silk weaving is an important industry; metal manufactories of all kinds, as well as manufactures of clothing and articles necessary to the shipping trade, are correspondingly greater than in smaller cities. In fact, it is impossible to give any clear idea of the extent and character of the varied industries which have made London what it is.

HISTORY. The southern part of Britain was made a Roman province during the reign of Claudius, and in the time of Constantine the Romans fortified and walled the camp and made it their great commercial city. At the time of the Conquest, in 1066, London submitted to William and received from him a charter which is still preserved. Other charters were granted by subsequent rulers. In the fifteenth century some of the principal streets were paved, but for many years afterward the sanitary conditions remained terrible. In December, 1664, began the great plague which carried off about 69,000 persons. In 1666 the great fire broke out, destroying 14,200 buildings and spreading over 336 acres. Many improvements were made in rebuilding, and from that time the growth of the city was rapid. The last time that the peace of London was seriously threatened was in 1780, when the Gordon riots took place and for two days terrified London. The growth and improvement at present are even more rapid than they have been at any time in the past.

POPULATION. In 1891 the population of Greater London was over 5,000,000. In 1901 it was 6,578,784.

LONDON, a city of Canada, the capital of Middlesex co., Ontario, on the river Thames and the Great Western Railway, 121 mi. w. of Toronto. There are extensive oil-refining works, iron foundries, chemical works and other manufacturing establishments. London is in the center of a fine agricultural region and carries

on active trade in wheat and agricultural produce. Western University, Huron College, Hellmuth College and Hellmuth Ladies' College are located here. Population, 1909, 50,000.

Long, JOHN DAVIS (1838—), an American politician and lawyer, born in Oxford County, Maine, and educated at Harvard. After studying law he was admitted to the bar in 1861 and practiced at Boston. He was elected to the state legislature and was made speaker of the house; was governor of Massachusetts for one term, and was member of Congress for three terms (1883-1889). He was appointed secretary of the navy by President McKinley in 1897, but resigned in 1902. He served as president of the board of overseers of Harvard College for a time.

Long Branch, N. J., a town in Monmouth co., 45 mi. by rail and 35 mi. by water from New York City, on the Atlantic Ocean and a branch of the South Shrewsbury River, and on the Pennsylvania and the Central of New Jersey railroads. Long Branch was first settled in 1670, when the land was owned by a British officer, Colonel White, who spent his summers here. After the Revolution, families from Philadelphia began to visit the place, and by the last of the century it had a wide reputation as a resort. It now has large hotels and boarding houses, picturesque cottages, and bathing houses, parks and places of amusement, which accommodate many thousands during the hot weather. Ocean Grove, which extends along the high bluff overlooking the sea, is a favorite walk. There are many churches, a public library, Monmouth Memorial Hospital and the Star of the Sea Academy. Population in 1905, 12,183.

Longevity, *lonjev'i ty*, long duration of life. It is purely a relative term, since some forms of plants and animals live on the average but a few hours, while others live for thousands of years. Two causes may produce unusually long life—heredity and environment—and each may limit or offset the effect of the other. In general it is known that forms of life which take long to develop and which reproduce late in life usually live longer than those which mature early and reproduce in their first stages. A crocodile has been known to live considerably more than a century. It has been reported that some fish live for one hundred fifty years, and certain species of birds, such as the heron, goose and swan, have sometimes lived to the age of one hundred or more. Of mammals, man, the elephant and the whale are the only ones that ever live longer than one hundred years, and

there are but few cases of human life extending over one hundred and eight. The horse and the bear frequently live to the age of forty, and one horse has been reported as still living at the age of seventy. Some ants have been known to live for fifteen years. The modern sciences of sanitation, medicine and surgery have increased the average duration of man's life perceptibly. According to the census of 1890, the average age at death of persons in the United States was 31.1 years. In 1900 this average had risen to 35.2 years.

Longfellow, HENRY WADSWORTH (1807-1882), an American poet, born at Portland, Maine. His mother, Zilpha Wadsworth, was a gentle and devout woman, and his father, who claimed descent from John Alden, was a most sensible and large-spirited man. Thus the refined, wholesome home influences of his childhood and youth gave final impress to a character naturally amiable, sympathetic and unselfish. At the age of fourteen he entered Bowdoin College, where he so distinguished himself in the study of modern languages that he was sent to Europe to prepare for the professorship which he held in that college from 1829 to 1834. In 1831 he married Miss Mary Potter, of Portland, a gifted and charming woman; and in 1834 he published his first important work, *Outre Mer*, a volume of prose sketches. He was elected in 1835 to the chair of modern languages and literature in Harvard University, and after another year spent in Europe in the study of Scandinavian languages and literature he entered on a professorship which was to last, with interruptions, for seventeen years. Before his return to America, however, he lost his wife, who died at Rotterdam in 1835. For a period of six years he remained at Harvard, living in the old Craigie house, where the prose romance, *Hyperion*, was published (1839), and the *Voices of the Night* (1839), *Poems on Slavery* (1842) and the *Spanish Student*, a drama in three acts (1843), were written. Then, for a third time, he went abroad. Returning, he resumed his professorship and retained it until 1854. His remaining years were quiet, contemplative and uneventful, except for the one tragedy which broke their serenity—the death of his second wife, who was burned before his eyes in their Cambridge home.

In 1847 *Evangeline* was published; in 1855, *The Song of Hiawatha*; and in 1858, *The Courtship of Miles Standish*, all thoroughly American in theme and sentiment. In 1863 *Tales of the Wayside Inn* appeared; in 1867, *Flower de Luce*, and in 1868 came *The New England*.



HENRY WADSWORTH LONGFELLOW

Long Island

Tragedy, which, with *The Golden Legend* (1852) and *The Divine Tragedy* (1872), forms the trilogy, *Christus*. In company with his three daughters, Longfellow made a last trip to Europe in 1868-1869. While abroad he received the degrees of LL.D. and D.C.L. from the universities of Cambridge and Oxford, respectively. And when he died, in 1882, his bust was placed in the Poets' Corner in Westminster Abbey, an honor which had never been accorded to any other American. *Three Books of Song*, *Aftermath*, *The Hanging of the Crane*, *Morituri Salutamus*, the *Masque of Pandora*, *Keramos* and *Ultima Thule* were the chief productions of Longfellow's later years.

Longfellow's power of graceful translation is seen in *The Poets and Poetry of Europe* (1845) and in the translation of Dante's *Divine Comedy* (1867), but his fame rests chiefly upon his three American epics. Though he possessed wide culture and his poetry is remarkably free from vulgarity, he is preëminently the poet of the common people. The truths he expresses may be commonplace, but they are realized by him with such fresh force and are so simply and sympathetically told that his power of appeal is unusually great among a large body of people for whom the more abstruse poets have no message. Refined in sentiment, musical in form, stimulating in effect, his verse is one of the most potent influences in American literature. His influence in his own day lay not only in his writings, but in the fact that he was one of the first American scholars to introduce into America the culture and learning of European countries. In all his work as a lecturer in college, he strove to present to his students the spirit and beauty of foreign literature, to widen their outlook. Of the briefer biographies of Longfellow the most satisfactory are those by Thomas W. Higginson and F. H. Underwood. The biography by Samuel Longfellow is a more extended work of two volumes.

Long Island, an island belonging to the State of New York, of which it forms the southeastern extremity. It is about 118 miles in length, and varies from 12 to 23 miles in breadth, while its area is 1682 square miles. It is connected with New York City by two great suspension bridges across East River (See **BRIDGE**, subhead *Suspension Bridges*) and is separated from Connecticut by Long Island Sound. There are considerable tracts covered with timber; the most fertile portions are carefully cultivated, and much produce is supplied for New York

Long Parliament

and Brooklyn. Railways are numerous. The chief city is the borough of Brooklyn, which is a part of Greater New York, but there are many popular seaside resorts along the coast.

Long Island, BATTLE OF, a battle of the Revolutionary War, fought on Brooklyn Heights, August 27, 1776, between an American force of 8000 under Israel Putnam, and a British force of 15,000 under General Howe. The Americans were attacked from four directions, and though they fought gallantly for more than four hours, they were compelled to flee, many surrendering. The British loss was about 400; the American loss, about 1400 in killed, wounded and captured. The battle decided Washington to evacuate his position on Long Island.

Long Island Sound, an arm of the Atlantic Ocean, between Long Island and the State of Connecticut, about 110 mi. long and from 20 to 25 mi. wide. It is connected with New York Bay by the strait called East River.

Longitude, *lon'ji tude*, in geography, the distance of a place due east or west from a meridian taken as a starting point, this distance being measured along the equator or a parallel of latitude. Longitudes are generally reckoned from the meridian of Greenwich; the meridians of Paris, Ferro and Washington are or have been also employed. Since the parallels of latitude get smaller toward the poles, at which all the meridians converge, it is evident that degrees of longitude which are $69\frac{1}{2}$ statute miles long at the equator get shorter toward the poles, at which they finally become 0. As the earth makes one revolution on its axis, that is, turns through 360° of longitude from west to east, in twenty-four hours, if the sun or a star is on the meridian of any place at a particular time it will be on the meridian of another place 15° west of the first in one hour. Thus, 15° of longitude represent one hour of difference in time, and hence longitude may be easily determined by the use of the chronometer set to Greenwich time, which is the method commonly employed at sea. Longitude is reckoned to 180° eastward or westward of the fixed meridian. See **LATITUDE**.

Long Parliamēt, the name given to the Parliament of Charles I which assembled in 1640 and was not formally dissolved until March, 1660. Summoned to supply Charles with the means of subduing the insurgents in Scotland, it **refused** to proceed to this business until it had secured the redress of certain grievances, and its first acts were the impeachment of Strafford and Laud and the abolition of the courts of High

Commission and Star Chamber. After its grievances had been attended to, Parliament turned its attention to religious questions, and here disagreement speedily arose. It was this Parliament which conducted the civil war against Charles I, and before the close of that struggle the Independents in the army had become strong enough to demand the withdrawal from Parliament of the Presbyterian members, who considerably exceeded in number the Independents. The name *Rump Parliament* is given to the body which remained. The Rump Parliament put Charles to death and established the Commonwealth, but Cromwell dissolved the body. After Cromwell's death it was called together again, but its only act of importance was to order a new election and vote its own dissolution.

Long'street, JAMES (1821-1904), a distinguished American general, born in South Caro-



JAMES LONGSTREET

lina. He graduated at West Point in 1842, saw service on the Mexican frontier and was brevetted captain and major for gallantry. When the Civil War broke out he gave up his commission in the army and joined the Confederate forces. He fought in the Seven Days' Battle, in the second Battle of Bull Run, at which his arrival at the right time turned defeat into a Confederate victory, at Fredericksburg, at Gettysburg, at Chickamauga and in the Battles of the Wilderness. After the war he held important govern-

ment positions, among them those of minister to Turkey and United States commissioner of railroads, which post he held at the time of his death.

Loo'-Choo', **Lu-Chu**, **Liu-Kiu**, **Liu-Chiu**, or **Riu-Kiu**, a chain of 55 islands in the Pacific Ocean, between Japan and Formosa. The largest island is Okinawa-Shima, or Great Loo-Choo, which has an area of about 500 square miles. The chief products of the islands are sugar, rice, wheat, maize and sweet potatoes; but cotton, sago, tobacco, indigo, figs and bananas are also grown. The inhabitants are mainly of a race akin to the Japanese. Since 1874 the archipelago has belonged to the Japanese Empire. Population, 453,550. See JAPAN.

Look'out Mountain, **BATTLE OF**. See CHATTANOOGA, **BATTLES OF**.

Loom. See WEAVING.

Loomis, CHARLES BATTELL (1861-), an American humorous writer. He was born in Brooklyn, N. Y., was educated in the Polytechnic Institute of Brooklyn and was in business as a clerk from 1879 to 1891. In addition to stories in nearly all the periodicals, he has published several volumes. Among his books are *Cheerful Americans*, *The Four-Masted Catboat*, *More Cheerful Americans* and *Yankee Enchantments*.

Loon. See DIVER.

Lope de Vega, *lo'pay da va'ga*. See VEGA CARPIO.

Lo'quat, a Chinese and Japanese fruit, cultivated in the sub-tropical countries of Europe and in California and Florida. The tree is an evergreen and has a height of 20 to 30 feet, but when cultivated, it is not allowed to exceed 12 feet. The fruit is pear-shaped, yellow and about an inch in diameter. The seeds have a fine flavor, which they impart to tarts. See FRUITS, *color plate*, Fig. 12.

Lorain', OHIO, a city in Lorain co., 25 mi. w. of Cleveland, on Lake Erie at the mouth of the Black River, and on the Baltimore & Ohio, the New York, Chicago & Saint Louis and the Lake Shore Electric railroads. It is in a natural gas region and forms an important outlet for the central Ohio coal fields. There is a good harbor, and large quantities of lumber, iron ore and grain are also exported. The industrial establishments include steel mills, foundries, shovel works, brickyards and shipbuilding plants. The city has a public library, Saint Joseph's Hospital and more than a score of churches. It was settled in 1822 and was incorporated as a village in 1873 and as a city in 1895. Population in 1900, 16,028.



LONGFELLOW'S HOME AND HIS STUDY

Lor'ca, a town of southern Spain, in the Province of Murcia, 42 mi. s. w. of the city of Murcia. It consists of an old Moorish town, on a slope crowned by a castle, and a lower modern town. There are manufactures of coarse woollens, linens, leather, saltpeter and powder. In the vicinity are lead mines. In 1802 the dam, which has been constructed for irrigation purposes, was broken, and the water from the great reservoir flooded the valley, causing great loss of life. Population in 1900, 69,910.

Lorelei, *lo're li*, a rock in the Rhine River, on the right bank, about 430 feet high. Its extraordinary echo gave rise to the legend that the rock was the home of a siren who, by her wonderful singing, lured all who passed by on the river to destruction. This legend is the subject of a beautiful poem by Heine.

Lo'renz, ADOLF (1854-), an Austrian surgeon, famous for his bloodless operations for the cure of deformities, especially the straightening of clubfoot and the reduction of hip dislocations. Doctor Lorenz has twice visited the United States, and in both instances he performed his remarkable operations in clinics for the instruction of other surgeons. His second trip was at the expense of a wealthy Chicagoan, in order that he might operate on a young daughter whose hips had been dislocated from birth. In this, Doctor Lorenz was successful, as he was in many other operations, which he performed without expense on poor children, who were brought to him at the clinics. He has published a number of important works, some of which have been translated into English. See ORTHOPEDICS.

Loreto, *lo ra'to*, a city of Ancona, Italy, 15 mi. s. e. of Ancona. It is especially noted as a great Catholic pilgrimage resort, and it is believed that here is the *Santa Casa*, said to be the house in which Christ lived at Nazareth with his mother and Joseph. There are many decorations here by the great masters. Population in 1901, 7845.

Lor'imier, GEORGE HORACE (1868-), an American editor and story writer. He was born in Louisville, Ky., the son of a Baptist clergyman, and was educated at Colby and at Yale. He entered upon a business career and later took up newspaper work. In 1899 he became editor of *The Saturday Evening Post*, and after that date he published *Letters from a Self-made Merchant to His Son* and *Old Gorgon Graham*. Both of these volumes contain truths and aphorisms of the business world, expressed so interestingly and pithily that the books enjoyed

an extensive popularity immediately upon their publication.

Lo'ris, a lemur found in the East Indies. It has a round head, long limbs, short muzzle, large eyes and no tail. One species is called the *slender loris*. All sleep during the day rolled up in a ball and clinging with all four feet to a branch. They are slow and stealthy and live upon birds, insects and vegetables. The *slow loris* is larger than the slender loris and is held in reverence by the Malays because of its odd appearance and retiring habits.

Lorne, JOHN, Sir. See ARGYLL, JOHN DOUGLAS SUTHERLAND CAMPBELL, Ninth Duke of.

Lorrain', CLAUDE. See GELÉE, CLAUDE.

Lorraine. See ALSACE-LORRAINE.

Lo'ry, a group of climbing birds belonging to the parrot family, with broad tails and dense, soft, brilliantly colored plumage. They live chiefly upon honey, which they are able to extract from flowers by means of their brush-tipped tongues. An Australian species has a bright green head and a blue body, marked on the under parts with red. The collared lory is easily taught to speak. See color plate, PARROT.

Los Angeles, *los an'gel es* or *an'jel es*, the county-seat of Los Angeles co. and the largest city in southern California, is situated on the Los Angeles River, 20 mi. from its mouth and 480 mi. s. by e. of San Francisco, on the Southern Pacific, the Atchison, Topeka & Santa Fé and the San Pedro, Los Angeles & Salt Lake railroads. The city is well laid out and is noted for its broad streets, many of which are well paved and all of which in the residential sections are embowered in palmetto palm, eucalyptus and other trees and various forms of tropical shrubs and flowers. The beauty of the city and its surroundings, together with its mild and equable climate throughout the year, has made Los Angeles a famous resort, and it is visited annually by thousands of tourists. The city has an elaborate park system, containing fourteen parks, the oldest of which is the Plaza, within the city limits; and another very frequently visited is Central Park, noted for its beautiful trees and flowers and for the soldiers' monument. Elysian Park is of interest because of Fremont's Gate, erected in honor of the great explorer, and its botanical gardens, which contain a great variety of trees, shrubs and flowers, gathered from nearly all parts of the world. Griffiths, the largest park, is in the foot hills without the city limits and contains about 3000

acres. An elaborate system of boulevards is in process of construction and when completed will connect all of these parks.

Among the public buildings of note are the Federal building, the city hall, the chamber of commerce, Blanchard Art Building, Huntington Building, the Angelus, the Van Nuys and the Lankershim hotels. Among the most noted churches are the Roman Catholic Cathedral; Saint Paul's Cathedral, Episcopal; the First Congregational, the First Methodist Episcopal, the Immanuel Presbyterian and the Old Plaza church, of interest historically as the headquarters of General Fremont. The city has a public library of about 100,000 volumes; it is also the seat of a state normal school and of the University of Southern California, Saint Vincent's College and Occidental College.

Los Angeles is in the center of a large fruit-growing region, which produces oranges, lemons, olives, prunes and numerous other fruits. Consequently, it is an important fruit market. Near by are oil wells, which furnish an abundance of cheap fuel for manufacturing purposes, and since 1900 the manufacturing industries of the city have developed very rapidly. Important among these is the refining of petroleum. Other manufactures consist of flour and grist mill products and such industries as meet the local demands, as much material can be manufactured in the city more cheaply than it can be imported from the eastern and central sections of the country. The city has regular steamer connection with San Francisco and other ports, through San Pedro, its seaport, 25 miles distant, with which it is connected by steam and electric railways. Near by are numerous suburbs noted for their beauty and as health and pleasure resorts. Among these are Hollywood, Santa Monica, Riverside, Redondo Beach, Redlands and South Pasadena, celebrated for its ostrich farm. The various parts of the city and these near-by towns, as well as numerous other points of interest, are all connected by one of the best systems of electric railways in existence.

Los Angeles was first visited by white men in 1769 and was named by the governor of that territory *Puebla de Nuestra Senora la Reina de Los Angeles*, which means "The City of Our Lady, the Queen of the Angels." The city was not really founded until 1781. From that time it grew slowly for a number of years, and previous to the American occupation it was for a time capital of the province. It surrendered to the United States troops in 1846 and in 1851 was

chartered as a city. After the construction of railway lines into southern California, the city began to increase in population rapidly, and the discovery of petroleum in the vicinity gave an additional impetus to its already thriving industries. Population in 1901, 102,479; in 1904, 170,000.

Los'sing, BENSON JOHN (1813-1891), an American historical writer, born in Bickman, N. Y. Beginning life as a journalist and publisher, he first attracted attention by his interesting pictorial field book of the Revolution, which was followed after some years by similar works upon the Civil War and the War of 1812. His researches in the preparation of these volumes led to the writing of several historical works, of which the chief are a series of school histories, a large history of the United States, *Life and Times of Philip Schuyler*, *Encyclopedia of United States History* and *The American Centenary*.

Loti, *lo'te*, PIERRE (1850-), a French sailor and author. He entered the navy in 1867, remained in the service until 1898, served with distinction in the Tonquin campaign and was decorated with the ribbon of the Legion of Honor in 1887. His works include *Aziyadé*, *The Marriage of Loti*, *Madame Chrysanthe* and *The Romance of a Child*. Loti was made a member of the French Academy in 1891.

Lot'tery, a scheme for the distribution of prizes by chance, the plan being generally to have a certain number of prizes and a much greater number of numbered tickets. The prizes are allotted to the holders of tickets which bear the same numbers as others drawn by chance from a receptacle. In the United States, lotteries were formerly very commonly resorted to as a means of assisting colleges or benevolent institutions, but they have been abolished. By act of Congress they are deprived of the use of the mails.

Lo'tus, a name given to a number of different plants. One grows in Egypt. It is a beautiful water lily, with large, white and fragrant flowers and immense, wide-spreading leaves. This lily was held sacred to Osiris in ancient times and was a symbol of the creation of the world. The lotus often appears in Egyptian paintings and is used in the decoration of the capitals of the Egyptian columns. The Arabs prize it and believe its fruit to be a food of paradise. In the United States the yellow water lily, or water chinquapin, is generally called the lotus (See *NELUMBO*), but the plant which is known by

botanists as the lotus is a little creeping herb, which is chiefly grown in temperate regions throughout the world. Four or five species are



AMERICAN LOTUS

found in Great Britain, where they are known as bird's-foot trefoil and cat-in-the-clover and by other fanciful names.

Lotze, *lo'tse*, RUDOLF HERMANN (1817–1881), a German philosopher and physiologist, born at Bautzen. Lotze's philosophy rests on the belief that everything in the universe has its cause in the notion of the Good, and that this notion underlies all the activities and phenomena of the world. His greatest research was in psychology, and he was one of the leading authorities on physiological psychology. His writings, which have been very influential in the United States, include *Universal Pathology*, *Logic*, *On the Idea of Beauty*, *Medical Psychology* and *System of Philosophy*.

Loubet, *loo bay'*, EMILE (1838–), a French statesman and president of the Republic. He began his career as a lawyer and rose rapidly. He was elected to the Chamber of Deputies in 1876 and to the Senate in 1885. In 1887 he became minister of public works, five years later he became premier and on the death of President Faure, in 1899, he was elected president of France. The country prospered under his administration. He was succeeded in 1906 by Fallières.

Louis I, *loo'is*, called *the Debonair* or *the Pious* (778–840), the son of Charlemagne, succeeded his father in 814 as king of the Franks and emperor of the West. In 817 he divided his dominions among his three sons, Lothair, Pippin and Louis. In 829, in consequence of the urgent solicitations of his second wife, Judith of Bavaria, who had borne him a son, he made a new division of the Empire. The result was that the elder brothers revolted and commenced a war, which, with varying fortune to the parties

concerned, lasted till the death of the emperor. He was succeeded as emperor by his son Lothair I; and by the Treaty of Verdun in 843 his son Charles the Bald obtained the territories from which France as a separate nationality developed; while another son, Louis the German, obtained territories from which the distinctive German nationality developed.

Louis IX, known as *Saint Louis* (1215–1270), king of France, eldest son of Louis VIII, succeeded to the throne in 1226. In the year 1244, when sick of a dangerous disorder, he made a vow to undertake a crusade to Palestine; and in 1248 he sailed with his wife, his brothers and a large army to Cyprus, whence in the following year he proceeded to Egypt. He was taken prisoner by the Mohammedans and released only on the payment of a large ransom, and it was not until the year 1252 that he returned to France. For the next fifteen years he employed himself in improving the condition of the people by wise laws. In 1270 he determined to undertake another crusade. He sailed to Africa, besieged Tunis and took its citadel, but a contagious disorder broke out, to which he himself fell a victim, together with a great part of his army. In 1297 he was canonized by Boniface VIII.

Louis XI (1423–1483), king of France, son of Charles VII. On his father's death, in 1461, he assumed the crown. The great object of Louis was the consolidation of France, the establishment of the royal power and the overthrow of the great vassals. In achieving this end he was very successful, although the means he used were most unscrupulous. He encouraged manufactures and trade and did much for the good of his kingdom, but was cold-hearted, cruel and suspicious. In 1481 Louis, who had been twice affected by apoplexy, haunted by the fear of death, shut himself up in his castle and gave himself over to superstitious and ascetic practices.

Louis XII (1462–1515), king of France from 1498 until his death. He was the son of Charles, duke of Orleans, grandson of Charles V, and came to the throne on the death of Charles VIII, whose widow he married. In Italy he conquered the Duchy of Milan, took possession of Genoa and fought with Ferdinand the Catholic for the kingdom of Naples. He also took part in the League of Cambrai against the Venetians, whom he defeated at Agnadello. In 1510, however, he had to face the Holy League, formed against him by the pope, Venice, England

and the Swiss. He was beaten at Novara by the Swiss and by the English at the Battle of the Spurs. He married, a short time before his death, Mary, the sister of Henry VIII of England.

Louis XIII (1601–1643), king of France, the son of Henry IV, ascended the throne in 1610, under the regency of his mother, Maria de' Medici. In 1614 Louis was declared of age, but for three years longer his mother managed to keep the power in her hands. She was at length banished from court, and the chief authority fell into the hands of various ministers. From 1624 Louis was almost completely under the guidance of Cardinal Richelieu, whose policy of oppression of the Huguenots brought on a war. Eventually Rochelle, the headquarters of the Huguenots, was captured (1628), and the revolt was put down. Louis was now induced by Richelieu to take part in the 'Thirty Years' War, and he gained frequent successes over the Austrians and Spaniards, adding Roussillon and Alsace to France.

Louis XIV (1638–1715), king of France, known as *Louis the Great*, son of Louis XIII and Anne of Austria, succeeded his father in 1643. His minority was occupied by the continuation of wars against Austria; by war with Spain; by the struggles of the parlement against the regent and Mazarin, and by the bloody troubles of the Fronde. In 1659 peace was concluded with Spain, and Louis married the daughter of Philip IV of Spain. On the death of Mazarin, in 1661, Louis resolved to rule without a minister. He reformed the administration and the taxes and chose as his chief adviser the famous Colbert, who accomplished a series of financial reforms, created the Company of the Indies, made roads and canals and founded manufactories. In 1662 Louis purchased Dunkirk from the needy Charles II of England. On the death of the king of Spain he claimed Franche-Comté, Luxemburg and various provinces of the Netherlands and invaded those territories, Turenne and Condé leading his armies. In 1672 he declared war with Holland, and in a few weeks he had conquered three provinces; but the formation of an alliance by the emperor, William of Orange, Spain and Denmark checked his ambition. Still the Treaty of Nimeguen (1678) left Louis in possession of Franche-Comté and a part of Flanders.

He was now at the height of his glory, and the splendor of his court far outshone that of other European courts. His wife died in 1683, and

Louis secretly married Madame de Maintenon about 1684. She is said to have had a considerable part in the revocation of the Edict of Nantes, which proved most unfortunate for France, by driving many industrious Protestants into exile. Louis's ambitious designs continued, and led, in 1689, to the formation of the League of Augsburg by Spain, Holland, England, the emperor and various small states. A general war continued with frequent and severe losses to the French till the Peace of Ryswick (1697), by which Louis was forced to restore all of his recent conquests and most of the acquisitions made since the Peace of Nimeguen. The question of the Spanish Succession once more brought Louis into conflict with a united Europe. The principal episodes of the war were the defeats of the French at Blenheim, Ramillies and Malplaquet; but circumstances favored Louis, and hostilities were terminated by the Peace of Utrecht in 1713, without altering the relative position of the combatants. His brilliant reign left France impoverished and most of her industries languishing. Louis was succeeded by his great-grandson, Louis XV.

Louis XV (1710–1774), king of France, great-grandson of Louis XIV, began his reign in 1715, but did not actually assume the government himself till 1723. In the interval the country was under the regency of the duke of Orleans, by whose folly it was brought to the verge of ruin. In 1726 Louis placed his tutor, Cardinal Fleury, at the head of the administration. In 1725 Louis had married Maria, the daughter of Stanislas Leszczynski, the dethroned king of Poland, and in 1733 he became involved in a war in support of his father-in-law's claims. After two campaigns he acquired for Stanislas the duchy of Lorraine. After the death of Charles VI, in 1740, the War of the Austrian Succession broke out, in which the victories of Count Maurice of Saxony gave new splendor to the French arms; and by the Peace of Aix-la-Chapelle, in 1748, France regained her lost colonies. Through Madame de Pompadour, under whose influence Louis had fallen, the Jesuits were declared a society hostile to France, and in 1764 by royal edict the order was suppressed throughout the French dominions (See **JESUITS**). From 1769 Louis was governed by Madame du Barry, who is said to have cost the royal treasury in five years 180,000,000 livres. The Seven Years' War (1756–1763), in which France was involved, brought severe losses and humiliations on the country. At Louis's death

the country was completely demoralized and deeply in debt.

Louis XVI (1754-1793), king of France, grandson of Louis XV. In 1770 he married Marie Antoinette of Austria. He ascended the throne in 1774, on the death of his grandfather, and soon proved himself a man of honest intentions but of little ability. He could not comprehend the situation of affairs, and the reforms which he instituted were by no means sufficient to check the general discontent. A succession of incapable comptrollers-general brought matters from bad to worse, and even the popular Necker was unable to maintain order. At last, in 1789, all the grievances and discontents which had been gathering during a long period of misrule found vent; the populace attacked and destroyed the Bastille and the revolution was accomplished. In June, 1791, the position of the king had become so perilous that he attempted to escape, but he was intercepted at Varennes and forced to return. Among the events which followed were the attack of the populace of Paris on the royal palace, June 20, 1792; the king's arrest in the National Assembly, to which he had fled for refuge, and finally, his trial before the convention, where he replied to the charges with dignity and presence of mind. On January 16, 1793, he was declared guilty of a conspiracy against the freedom of the nation; on the following day he was condemned to death, and on January 21 he was guillotined.

Louis XVII (1785-1795), titular king of France, second son of Louis XVI. On the death of his elder brother, in 1789, he became dauphin, and on the death of his father he was proclaimed king by the royalists, but he was soon afterward separated from his mother and delivered to a shoemaker named Simon, a fierce Jacobin, who treated the boy with the most unfeeling barbarity. He survived this treatment only two years.

Louis XVIII (1775-1824), king of France, brother of Louis XVI, known before his accession to the throne as Monsieur. After the death of Louis XVI, Monsieur proclaimed his nephew king of France as Louis XVII, and on the death of the boy he was himself proclaimed by the émigrés, king of France and Navarre. For many years he led a wandering life, supported by foreign courts and by some friends of the House of Bourbon. He at last took refuge in England and lived there till the fall of Napoleon opened the way for him to the French throne. He entered Paris in May, 1814; he had to flee

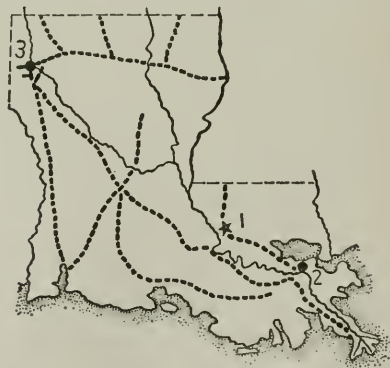
on Napoleon's escape from Elba, but was replaced on the throne by the allies after Waterloo. He was weak in character, but his government was most despotic.

Louisa, *loo e'zah*, AUGUSTE WILHELMINE AMALIE (1776-1810), queen of Prussia, wife of Frederick William III. Her beauty, her dignity and her gentleness made her exceedingly popular, and her patriotic spirit in demanding that Prussia should stand firm in its opposition to Napoleon increased the love which the Prussian people bore for her.

Louisburg, *loo'is burg*, SIEGES OF, two famous sieges about the village of Louisburg, Cape Breton Island. The place had been strengthened by the French until it was considered the strongest citadel in the New World, but was taken by a British and colonial force during King George's War in 1745, the French surrendering about 1600 men. It was restored by the Treaty of Aix-la-Chapelle, but was again besieged in 1758, during the Seven Years' War, and again captured. Under British rule the fortifications were destroyed.

Louisburg is situated on the Atlantic coast of Cape Breton Island and has a fine harbor, but it has become of little importance, save as a shelter from storm.

Louisiana, *loo e'ze ah'na*, the CREOLE STATE, one of the Gulf States, bounded on the n. by



LOUISIANA

1, Baton Rouge; 2, New Orleans; 3, Shreveport.
Dotted lines indicate chief railroads.

Arkansas and Mississippi, on the e. by Mississippi and the Gulf of Mexico, on the s. by the Gulf of Mexico and on the w. by Texas. The Mississippi River forms a portion of the eastern boundary, and the Sabine forms about two-thirds of the western. The greatest length from north to south is 280 miles, and from east

to west, 290 miles. The area is 48,720 square miles, of which 3300 square miles are water. Population in 1900, 1,381,625, of which 652,000 were colored.

SURFACE AND DRAINAGE. Louisiana is one of the lowest and most level states in the Union. The highest land consists of ridges which cross the central northern counties and nowhere exceed 500 feet in altitude. The land along the Mississippi and other rivers consists largely of flat plains, and the southern portion of the state is a gulf plain, extending inland 60 miles or more. This is cut up by lakes and lagoons and is generally swampy. Much of it has been formed by the rivers flowing into the gulf and is delta land, that formed by the Mississippi extending the farthest into the gulf. A line drawn east and west north of Lake Pontchartrain through Baton Rouge, thence a little to the southwest, practically separates this plain from the higher land, which is somewhat rolling and hilly.

No other state has so many miles of navigable water as Louisiana. The Mississippi passes through about one-half of the state and borders the other half. The Red River crosses the state from the northwest and joins the Mississippi, while the Ouachita enters near the north-eastern corner and flows southward to near the middle of the state, before joining the Red. All of these streams are navigable, while the southern part of the state is cut up by bayous, which are really broad estuaries of streams, all of which are navigable.

Louisiana contains many lakes. Those in the gulf plain on the south are really shallow arms of the sea, and their water is salt or brackish. In the interior, along the rivers, are found numerous lakes, which are really lagoons that were formerly in river channels but have been cut off by changes in river courses. Such lakes are usually in the form of arcs of a circle and are connected with streams. Along the Red River in the northwestern part of the state are numerous lakes, which have been formed from the tributaries to that stream. These have had their outlets closed by the gradual rising of the river bed through continual deposit of sediment.

CLIMATE. Louisiana has a semi-tropical climate, though, owing to the nearness of the gulf, the intense heat is modified and the climate is equable. The average temperature for January is about 60° in the southern part of the state, and about 45° in the northern, while in the summer the thermometer may rise as high as 100°.

The coldest weather usually comes in February, and frosts occur from the first of November until the first of March; but the thermometer seldom reaches zero point. The entire state has an abundance of rainfall, averaging 60 inches in the southern half and 50 in the northern.

MINERAL RESOURCES. The mineral resources are limited. Petroleum is found in the southwestern parishes of the state, which contain an extension of the Texas oil field. The Louisiana fields now yield over 200,000 barrels a year. Rock salt is found on the island of Petite Anse, and it is also obtained from marshes along the coast. There is also a coal region, an extension of the Texas field; as far as exploited it has yielded good returns. There are also in different parts of the state deposits of limestone and gypsum, and some mineral springs produce waters valuable for their medicinal properties.

FORESTS. Louisiana contains extensive forest areas. These are found in the northern and eastern parts of the state and along the Red River. The prevailing trees are the long- and the short-leaved pine, and the swamp regions contain large quantities of cypress. Intermingled with these woods are numerous varieties of hard wood.

AGRICULTURE. The soil and climate of the state are favorable to the growth of many crops produced in semi-tropical regions, and Louisiana is the leading state of the Union in the growth of sugar cane and rice. These crops prevail in the southern part of the state, the rice fields occupying much of the swamp land west of the Mississippi. North of the region devoted to sugar cane is the area devoted almost wholly to cotton. This is the most extensive crop in the state, though its value is usually less than that of the sugar cane. Other important crops are corn, oats and fruits, which are now extensively cultivated for Northern markets. But little attention is given to the raising of live stock, though the state raises nearly all the horses and mules needed for tilling the soil.

MANUFACTURES. The refining of sugar is the leading manufacturing industry. This is followed by the making of cottonseed oil and cake and the preparation of lumber. Industries of less importance include the manufacture of tobacco products, bags, foundry and machine shop products; the raising and shipping of oysters employ a large number of people along the coast.

TRANSPORTATION AND COMMERCE. The navigable rivers enable almost all parts of the

Louisiana

state to be reached by water; hence, transportation is comparatively easy and cheap. There are about 3000 miles of railway running through the state. These lines consist of trunk lines extending north and south and from the northwest to the southeast, besides an east and west line across the northern part of the state and another extending to the Pacific coast across the southern part. New Orleans is the great railroad center, and Shreveport ranks next to it in this respect. The commerce of the state consists in the export of sugar, cotton, lumber and fruit, and the importation of manufactured articles.

GOVERNMENT. The legislature consists of a senate that cannot exceed 41 members, and a house of representatives that cannot exceed 116 members. The members of each branch are elected for four years. The executive department consists of the governor, a lieutenant governor, an auditor, a treasurer and a secretary of state, each elected for four years. The judicial department consists of a supreme court, a court of appeals and district courts. The supreme court comprises one chief justice and four district justices appointed by the governor and senate for a term of twelve years. The state is divided into four supreme court districts. The court of appeals is composed of two district judges appointed by the supreme court. There are about thirty judicial districts, in which district judges hold court.

The local government of Louisiana is unique and differs very materially from that found in any other state of the Union. This is due to the fact that the state was settled by the French, who, previous to the Louisiana Purchase, had thoroughly established their laws and institutions, most of which have been retained, with but little modification. The state is divided into parishes, instead of counties, and the French civil law is authority in settling local matters.

EDUCATION. Public schools are provided for both white and colored children, and notwithstanding the difficulties with which the state has been obliged to contend since the Civil War, the schools are constantly increasing in number and are raising their standard. Cities and towns have graded schools, and the state fund is supplemented by local taxation. The state maintains a normal school at Natchitoches. The state university, with the Agricultural and Mechanical College, is located at Baton Rouge and is at the head of the public school system. Tuition is free to residents of the state. Other

Louisiana

universities and colleges of importance are Tulane University, at New Orleans; the industrial institute, at Ruston; the Southwestern Industrial Institute, at Lafayette, and the Southern University for colored students, at New Orleans.

INSTITUTIONS. The state schools for the blind and deaf are at Baton Rouge. Charitable hospitals are maintained at New Orleans and Shreveport, and the asylum for the insane is at Jackson.

CITIES. The chief cities are Baton Rouge, the capital; New Orleans, Shreveport, New Iberia, Lake Charles, Alexandria and Monroe, each of which is described under its title.

HISTORY. Louisiana was first visited by Europeans about 1519, when Alvarez de Pineda and his companions entered the mouth of the Mississippi and spent six weeks on its banks. In 1541 De Soto, the Spanish adventurer, explored the coast west of Florida to the Mississippi River and visited the country on both sides of the river where New Orleans now stands. In 1682, La Salle descended to the mouth of the river, took possession of the country and named it Louisiana, in honor of his king, Louis XIV of France. The first permanent settlement was made in 1699 by d'Iberville, at Biloxi. In 1718, the charter of the Company of the West (see LAW, JOHN), was registered in the parlement of Paris, and the commerce of Louisiana was granted to it for twenty-five years. In the same year, Bienville, the governor of the colony, founded New Orleans. In 1733 France declared Louisiana a royal province, and in 1763, by secret treaty, she ceded to Spain all that portion which lay west of the Mississippi, together with the city of New Orleans and the island on which it stands. On the same day France ceded to Great Britain all the rest of her territory in America. In 1800, Napoleon restored Louisiana (including all the vast territory west of the Mississippi River) to France, and in 1803 he sold the province to the United States for \$15,000,000. Louisiana, comprising the present area, was admitted to the Union in 1812. In the War of 1812, New Orleans was attacked by the English and was bravely defended by about 5000 men under General Jackson (See NEW ORLEANS, BATTLE OF). The progress of the state from the close of this war until the Civil War was rapid. Baton Rouge became the capital in 1852. Louisiana passed the ordinance of secession Dec. 23, 1860, and in 1861 it ratified the Confederate constitution. New Orleans was occupied by

Union forces after May, 1862, and the state suffered severely from the cessation of commerce. During the period of reconstruction, Louisiana was the scene of long-continued excitement, extending through Hayes's administration. Bloodshed was frequent. In 1868, Louisiana ratified the Fourteenth Amendment, and in 1877 a new constitution was adopted. In 1884 occurred the New Orleans Exposition, which had valuable commercial results. After a long contest in 1891, the state lottery was abolished. The state has also been concerned with the establishment of peaceful and satisfactory relations between the white and black races. Consult Phelps's *Louisiana*, in the American Commonwealths Series.

Louisiana, Mo., a city in Pike co., 86 mi. n. w. of Saint Louis, on the Mississippi River and on the Chicago & Alton and the Chicago, Burlington & Quincy railroads. It is in an agricultural region and has a large trade in fruit, tobacco, grain and live stock. The industrial establishments include flour and lumber mills, tobacco and wagon factories, a stone quarry, a lime kiln, brick yards and large nurseries. Population in 1900, 5131.

Louisiana Purchase, the purchase from France by the United States, in 1803, of the territory known as the Province of Louisiana. It was brought about by the discovery, in 1802, that Spain had ceded Louisiana to France by a secret treaty in 1800. This caused the greatest uneasiness on the part of American statesmen, since they felt that this event was merely a step in France's policy to regain its foothold in America. In order to prevent the carrying out of this plan, President Jefferson urged the purchase of the territory at the mouth of the Mississippi from France, in order that the Mississippi might be the boundary between the territory of the two nations. Robert R. Livingston was dispatched to accomplish this purchase and was met by a proposal on the part of Napoleon to sell the entire Province of Louisiana. An agreement was finally made by the promise of the United States to pay eighty million francs to France and to assume the debts of Americans to French citizens, amounting to twenty million francs. The agreement was signed April 30, 1803, and was ratified October 20. Though Jefferson believed such a step was unconstitutional and at first urged the passage of a constitutional amendment, the unanimity among the people in favor of it finally led him to accept the result. The total cost to the United States,

including principal, interest and debts, was about \$27,500,000. The area of the territory was 875,025 square miles, or if the Oregon country be included, more than a million square miles. It included almost all of the area that now constitutes twelve states and two territories, whose present population is about 15,000,000, and the value of whose agricultural products alone in 1900 was \$755,000,000.

Louisiana Purchase Exposition, a world's fair, held at Saint Louis, Mo., in the summer of 1904, in celebration of the one hundredth anniversary of the transfer of the territory of Louisiana from France to America. The site chosen for the exposition was Forest Park, consisting of more than one thousand acres, in the western portion of the city. In this enclosure fifteen mammoth exhibition buildings were erected, arranged in the shape of a fan, the pivotal point being occupied by three domed buildings, from the center of whose base flowed a broad stream of water, which fell in cascades over a green background seventy feet in height to the grand basin below. Special care and skill were used in the distribution and designing of the buildings to produce a truly artistic scene, and the result exceeded all expectations in this respect. The total cost to the exposition company before the opening of the gates was nearly \$20,000,000, of which \$5,000,000 was donated by the United States government, \$5,000,000 by the city of Saint Louis, and \$5,000,000 by the citizens of Saint Louis. In addition, the United States government spent \$1,500,000 on its own exhibit and \$1,000,000 on the exhibit of Philippine life and products. Forty-two states were represented by buildings and special exhibits, costing more than \$7,000,000, while many of the most important foreign nations also erected buildings, at a cost of fully \$7,000,000. The total attendance was about 21,000,000. The place of the Midway at the World's Columbian Exposition was taken by the Pike, which, though similar to the former in character, far exceeded it in size.

Louisiana State University and Agricultural and Mechanical College, a state university, established in 1855, as the State Seminary of learning. The school was opened at Alexandria, La., in 1860, with William T. Sherman, who afterwards became one of the most prominent Union generals in the Civil War, as superintendent. During the war it was suspended, but it was revived in 1874 by the establishment of an agricultural college, which

was temporarily located at New Orleans. Three years later this was combined with the college at Baton Rouge, and the university was chartered under its present name. It maintains courses in classics, literature, general science, mechanical and civil engineering, agriculture, including a special course in the cultivation and manufacture of sugar, and commerce. Three experiment stations connected with the university are located, respectively, at New Orleans, Baton Rouge and Calhoun. The faculty numbers about thirty, and there are about 400 students; the library contains 23,000 volumes. Most of the income is derived from state and government appropriations.

Louis Philippe, *loo e' je leep'*, (1773-1850), king of the French. He was the eldest son of Philippe, duke of Orleans, surnamed Egalité, and during his father's lifetime he was known as the duke of Chartres. He entered the army in 1791 and, favoring the popular cause in the revolution, took part in the battles of Valmy and Jemappes and distinguished himself at Neerwinden. At the Revolution of July, 1830, he was made "lieutenant general of the kingdom," and in August he became king of the French. He reigned for eighteen years, but his rule was popular with no class of people and the Revolution of 1848 drove him from the throne. He went to England, where he remained till his death.

Louisville, *loo'y vil* or *loo'is vil*, Ky., the county-seat of Jefferson co., situated on the Ohio River, 400 mi. above its mouth and 130 mi. s. w. of Cincinnati, on the Southern, the Illinois Central, the Louisville & Nashville, the Chesapeake & Ohio, the Pennsylvania, the Baltimore & Ohio Southwestern and other railroads. The city extends along the river front for over 7 miles, and its area is about 20 square miles. It is built upon a plain, which slopes gently toward the river but is sufficiently elevated to be free from danger from high water. It is connected with New Albany and Jeffersonville on the Indiana side by three bridges, varying from one-half to one mile in length. The falls in the Ohio at this place constitute a series of rapids, in which the river descends over 20 feet in the course of 2½ miles. A canal has been constructed around these falls to provide for navigation during low water. The city is regularly laid out, has wide, well-paved streets and beautiful squares. The streets contain numerous shade trees, and the residential sections are noted for their beauty, most of the houses being

set back from the street and surrounded by fine lawns. The business portion of the city is compactly built, Main, Market, Jefferson and Fourth streets and the cross streets from First to Fifteenth being the principal business streets. There are a number of parks, the most important of which are Iroquois Park, containing over 550 acres, situated on the south side of the city, and Cherokee Park, on the east side. Shawnee Park, situated along the river bank in the west portion of the city, affords a beautiful view of the river and the opposite banks in Indiana. Near Cherokee Park is Cave Hill Cemetery, noted for its beauty and for a number of fine monuments.

The chief public buildings are the courthouse, erected at a cost of over \$1,000,000; the city hall, the customhouse, the Masonic temple, the Board of Trade building, the Commerce building, the Kentucky National Bank and the building of the *Courier-Journal*. Among the churches worthy of mention are the Roman Catholic cathedral, Christ's Church cathedral (Episcopal), the Warren Memorial church, the Second Presbyterian church, the Church of the Messiah, the Temple Adas Israel and the Broadway Baptist. Louisville is an important educational center. It has 9 medical colleges, a dental school, 2 law colleges, 3 theological seminaries, 2 schools of pharmacy and several other educational institutions. The public library contains over 50,000 volumes. The Polytechnic Society of Kentucky, a literary and scientific organization, also has a library of over 57,000 volumes, and its building contains a museum of natural history, a fine collection of paintings and one of the largest collections of minerals in the United States. The state school for the blind is also located here and has connected with it the American Printing House for the Blind (See BLIND, EDUCATION OF THE).

Louisville is an important manufacturing center. Its chief products include whisky, jeans, plows, cement, flour, farm wagons, malt liquors, furniture, foundry products and agricultural implements. Pork packing is also an extensive industry. The city is one of the chief distributing points for the southwest and has an extensive trade. It is the largest leaf-tobacco market in the world and handles fully one-third of all the tobacco raised in the United States. Its trade in pork, wheat and corn is also extensive.

The first settlement was made in 1778, and two years later it was incorporated as a town.

and named Louisville, in honor of Louis XVI of France. In 1824 it was chartered as a city. During the Civil War Louisville was in sympathy with the Unionists. In 1890 it was seriously damaged by a tornado, which caused considerable loss of life and property, but the damage was immediately repaired. Population in 1900, 204,731.

Louse, the common name of a genus of insects, parasitic on man and other animals. The common louse is furnished with two simple eyes, one on each side of its head, and a mouth adapted to sucking. The legs are short, with short claws or with two opposing hooks, which give a very firm hold. The body, which is composed of eleven or twelve distinct segments, is flattened and nearly transparent. The young pass through no metamorphosis, and their multiplication is extremely rapid. Most, if not all, mammals are infested by lice, each having generally its own peculiar species. Three species are said to belong to man.



LOUSE, MUCH ENLARGED

Louvain, *loo vaN'*, a town in Belgium, in the Province of Brabant, 18 mi. e. of Brussels, on the Dyle River. The city is well built and has some fine buildings, among which are the townhall, supposed to be among the finest in Europe; the churches of Saint Pierre, Saint Gertrude, Saint Michel, Saint Jacques and the modern Church of Saint Joseph. Besides these buildings there are the theater, the postoffice and the famous University of Louvain. There are also two seminaries, an industrial school, an art school and an athenaeum. Louvain was famous in the fourteenth century for its great cloth-making industry, which employed about 15,000 people. Now, however, this industry has disappeared. The chief products are beer, tobacco, lace and starch. Population in 1901, 42,308.

Louvre, *loo vr'*, a group of magnificent buildings in Paris, on the Seine. It was begun in 1204 and was used at various times as fortress, prison and castle. Francis I, after 1541, erected that part of the palace which is now called the *old Louvre*, and the buildings have been enlarged and adorned by successive kings, particularly by Louis XIV, until little trace of the original buildings remains. The *new Louvre* was begun by Napoleon I, as a museum for the art treasures which he obtained from the nations he conquered, and was completed by Napoleon III in 1857. The whole group of buildings is distinguished by its great extent and by its

elegant and sumptuous architecture. It contains paintings, among which are masterpieces of Murillo, Titian, Michelangelo, Delaroche, Bonheur and others; drawings; engravings; bronze antiques; sculptures, ancient and modern, together with special collections of antiquities and an ethnographic collection. It is the most extensive and varied museum in Europe. It was much injured by the Communists in May, 1871, the Richelieu pavilion, containing the imperial library of 90,000 volumes and many precious manuscripts, having been entirely destroyed.

Lovebird. See PARROT.

Lovejoy, ELIJAH PARISH (1802-1837), an American reformer, born at Albany, Maine. He graduated at Waterville College in 1826 and at Princeton Theological Seminary in 1833, and he became editor of the *Saint Louis Observer*, a Presbyterian paper, soon afterward. He soon took an active interest in the anti-slavery agitation and incurred the displeasure of pro-slavery citizens of Saint Louis. He therefore removed his plant to Alton, Ill., but it was seized and destroyed. Two other presses were also destroyed by mobs, and finally, on November 7, 1837, another mob of forty men attacked a warehouse containing a fourth press belonging to Lovejoy and guarded by several of his friends. In the mêlée Lovejoy was mortally wounded. The event caused the greatest indignation throughout the North and was the occasion of the first great anti-slavery address of Wendell Phillips.

Lov'er, SAMUEL (1797-1868), an Irish novelist, poet and artist, born in Dublin. He first devoted his attention to painting, but afterward turned to literature. He at first wrote songs and ballads, and later he published several novels, which he illustrated with his own pencil. Among his works are *Legends and Stories of Ireland*; *Rory O'More*, his most famous ballad; *Songs and Ballads*, and the novels, *Handy Andy* and *Treasure Trove*. *The Angel's Whisper* and *The Low-backed Car* are among his most popular songs.

Low, SETH (1850-), an American administrator and educator, born in Brooklyn, N. Y. He was educated at Brooklyn Polytechnic Institute and Columbia College. He began his business career as a clerk in his father's store, where he rose to the position of partner. He early manifested an interest in public affairs and was the organizer and first president of the New York Bureau of Charities. In 1881

Low Archipelago

Mr. Low was elected mayor of Brooklyn on an independent ticket, and was reelected for a second term. His administration was characterized by a radical reform in all departments of city administration, and, especially, by the advancement of the public schools. In 1889 he was elected president of Columbia College, and during his administration the work of the institution was thoroughly reorganized and placed on a university basis, the college was located on its present site and its name was changed to Columbia University. He was appointed one of the members of the United States delegation to the Hague Peace Conference, and in 1901 he was elected mayor of Greater New York on an independent ticket. His administration was characterized by extensive reforms in the financial and police departments.

Low Archipelago or **Tuamotu Islands**, an extensive group of islands lying in the Pacific Ocean, e. of the Society Islands and s. of the Marquesas. The archipelago is divided into a number of groups, including Gambia Islands on the southeast, Claremont, Tonnerre, Krusenstern and a number of others, Pitcairn Island being sometimes included among them. With scarcely an exception, the islands are of coral formation and are in the form of rings, each enclosing a lagoon. The chief exports are pearl shells and coconuts. The islands are under French protection, the seat of government being Rokoava. Population, about 7000.

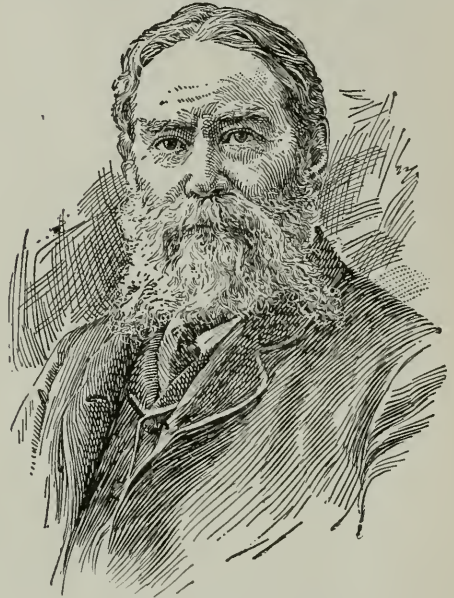
Lowell, lo'el, MASS., one of the county-seats of Middlesex co., about 25 mi. n. w. of Boston, on the Merrimac River at the mouth of the Concord and on the New York, New Haven & Hartford and several lines of the Boston & Maine railroads. Some of the features of interest are the Fort Hill Park, the Ladd-Whitney Monument, the Pawtucket Falls and the Rogers Street stone bridge. The Lowell Textile School, the state normal school, Rogers Hall School, Saint Patrick's Academy and other schools are located here. There are also various charitable institutions, a large public library and several churches.

The Merrimac River has a fall of thirty-two feet at this point, and the Canal and Lock Company completed the first system of canals in 1825. These have since been improved and well equipped with locks and bridges. The first mill was erected in 1823, and the city is now widely known for its textile manufactures. The principal products are cotton, woolen, worsted goods, hosiery, felt, carpets and foundry

Lowell

products. Lowell was founded in 1822 by the Merrimac Manufacturing Company. The settlement grew rapidly, was incorporated as a town in 1826 and was chartered as a city ten years later. Population in 1905, 94,889.

Lowell, JAMES RUSSELL (1819-1891), America's most representative man of letters,



JAMES RUSSELL LOWELL

great as poet, critic, essayist, orator and diplomat. He was born at "Elmwood," Cambridge, February 22, 1819, and his ancestors were among the earliest and most eminent settlers in New England. His early education came not so much from his work in school as from his reading and his out-of-door rambles. When he was sixteen years old he entered Harvard University, and while here it is said that he read everything except his text-books; certain it is that he almost failed to get his degree. He did graduate, however, in 1838 and then studied law for three years, after which he was admitted to the bar in Boston. This profession was uncongenial to him, and it is uncertain whether he ever had any clients. He soon gave it up and determined to devote himself to literature, and in 1843 he helped to found a monthly magazine, *The Pioneer*. Hawthorne, Poe and Whittier were also contributors to this periodical, but it did not meet with success.

As a college student Lowell had written verse, and at his graduation he wrote the class poem. His first serious attempt at poetry, however,

was a volume of love lyrics inspired by Maria White, whom shortly afterward he married. She induced him to use his genius in promoting the cause of freedom, and the result was the first series of the famous *Biglow Papers*, published in 1848. In this same year he published *The Vision of Sir Launfal*, his best-known poem, and the *Fable for Critics*, which, in spite of its frolicsome tone, shows much real critical power. In 1855 Lowell was appointed to succeed Longfellow as professor of modern languages at Harvard, and he spent two years abroad preparing for the duties of that position. In 1857 was founded the *Atlantic Monthly*, of which Lowell was the first editor, and he was also during the years that followed a frequent contributor to the *North American Review*. Lowell's first wife died in 1853, and he married four years later Miss Frances Dunlop, with whom his life was very happy.

Meanwhile, his writings had brought him before the public as an independent supporter of the Republican party, and in 1876 he was made a presidential elector. In the following year he was appointed by President Hayes minister to Spain, and three years later he was transferred to England, where he remained until 1885. During this service he did much toward bringing the American and British people together. He was very prominent and exceedingly popular while in Great Britain. Lowell's wife died in the year that he returned to America, and he himself died six years later, in the old family mansion "Elmwood," where he was born and where he had lived most of his life.

Besides the works mentioned above, Lowell produced a second series of *Biglow Papers*, dealing with the Civil War; *The Commemoration Ode* to the Harvard graduates who died during the war, which is one of the most beautiful poems of its kind ever written; *Under the Willows*, a volume of verse issued in 1869 and containing many of his best poems; *The Cathedral*, his longest poem, which is of very uneven merit and into which he introduced, in the midst of the most serious passages, prankish humor. The chief elements which make Lowell's poetry great are its sound common sense and its vigorous expression. It is not evenly beautiful, as is that of Longfellow, and it is, like his prose work, often so crowded with literary references and allusions as to be difficult reading. Among his chief prose works are *Fireside Travels*, which abounds in pleasant fancy; and *My Study Windows* and *Among*

My Books, two volumes of criticisms which show that he is entitled to rank with the best of American critics. Consult biographies by Underwood, Edward Everett Hale and Horace E. Scudder.

Lower California. See CALIFORNIA, LOWER.

Low German. See PLATTDEUTSCH.

Lowndes, lownds, WILLIAM (1782-1822), an American statesman, born in Colleton County, S. C., educated in England and admitted to the bar in 1804. He became a planter, however, was elected to the South Carolina legislature as a Jeffersonian Republican and entered Congress in 1810. There he attained prominence as an opponent of the administration during the War of 1812 and as chairman of important committees. In 1821 he was nominated for the presidency by the legislature of his state, but received only scattering support. His health failing, he sailed for Europe in October, 1822, and died at sea. During his term in Congress he gained the esteem of the greatest of his contemporaries, including Henry Clay, who once said that he was the wisest man he ever knew.

Loyo'la, IGNA'TIUS OF (1491-1556), original name, Inigo Lopez de Recalde, the founder of



IGNATIUS OF LOYOLA

the order of the Jesuits, was born at the castle of Loyola, Guipuscoa. When still a young

man, he entered the army, and during the defense of Pampeluna in 1521 against the French, he was severely wounded, and a long and tedious confinement was the result. The only books he found to relieve its tedium were books of devotion and the lives of saints. This course of reading developed in him a state of devotion in which he renounced the world, made a formal visit to the shrine of the Virgin at Montserrat and vowed himself her knight. After his dedication he made a pilgrimage to Rome and Jerusalem; then he attended the schools and universities of Barcelona, Alcala and Salamanca. On completing his studies he went to Paris, where he went through a seven years' course of general and theological training. Here, in 1534, he formed the first nucleus of the Society of Jesus, or Jesuits, which afterward became so famous. François Xavier, professor of philosophy, Lainez and others, in conjunction with Loyola, bound themselves together to devote themselves to the care of the Church and the conversion of infidels. Rome ultimately became their headquarters, and Loyola submitted the plans of his new order to Pope Paul III, who, under certain limitations, confirmed it in 1540. Loyola continued to reside in Rome and governed the society he had constituted till his death. He was beatified in 1607 by Paul V and was canonized in 1622 by Gregory XV. See JESUITS.

Lub'cock, JOHN, Sir, Baron Avebury (1834—), a British scientist and statesman, born at London and educated at Eton College. In 1848 he joined his father, Sir John William Lubbock, a famous astronomer and mathematician, in the banking business, and in 1856 he became a full partner in the firm. In this profession he became conspicuous and held many responsible positions under the government, in connection with financial and educational affairs. In 1870 he was elected as a Liberal to Parliament, and with the exception of a brief period he continued to be a member until 1900. During the latter years of his service he acted with the Liberal Unionists. Upon retiring from Parliament, he was made a peer, as the first baron of Avebury. Besides being responsible for the passage of many important financial and educational measures, he won distinction as an archaeologist and anthropologist. He published many volumes, of which the most important are *Prehistoric Times*; *Origin of Civilization*; *Ants, Bees and Wasps*; *Flowers, Fruits and Leaves*; *The Senses, Instincts and Intelligence of Animals*; also several volumes of

essays, of which the best known are *The Pleasures of Life*, *The Beauties of Nature* and *The Use of Life*. By his clear description and explanations of scientific principles he did much to popularize the study of science, especially in England.

Lübeck, one of the three city-states of the German Empire. It stands on a low ridge at the junction of the Wakenitz with the Trave, 36 miles northeast of Hamburg and 10 miles from the Baltic. The manufactures are comparatively unimportant, but the trade is extensive, especially with Hamburg, the Baltic ports and the interior of Germany. Lübeck possesses a territory of 115 square miles and includes several isolated portions of Holstein and Lauenburg. It has a senate of 14 members and a council of burgesses of 120 members. It became an imperial free city in 1226, and about thirty years later it became the head of the Hanseatic League. Population of town, 82,098; of the territory, 96,775.

Lucayos, *lu ki'yose*. See BAHAMA ISLANDS.

Luc'ca, a city of Italy, in the Province of Lucca, Tuscany, 15 mi. n. e. of Pisa. The city is surrounded by fortifications, and most of the architecture is medieval. Among the chief buildings are the churches, the Romanesque Cathedral of San Martino, the Basilica San Ferdinando and the Palazzo Provinciale, formerly the residence of the dukes. On the remains of a large Roman amphitheater stands the city market. There are two academies of science, literature and art in Lucca, and the city contains four libraries. It is especially famous for its manufactures of silks, velvets and other textiles, and there are also foundries and glass and paper factories. Lucca was first an Etruscan town and was taken in 177 B.C. by the Romans, who made it into a colony. After the fall of Rome it was owned by the Ostrogoths, the Lombards and the Franks, successively. Before the rise of Florence, Lucca was a very important town, but later declined, being weakened by the contests between the Guelphs and the Ghibellines. By the Congress of Vienna it was given to Maria Louisa, the Spanish infanta, and her son Charles Louis. In 1847 the duchy united with Tuscany, and together they became a part of united Italy in 1860. Population in 1901, 74,971.

Lucerne or **Lucern**, *lu'surn*. See ALFALFA.

Lucerne, *loo surn'*, a city of Switzerland, capital of a canton of the same name, situated on the margin of Lake Lucerne. It is a very

popular tourist resort on account of the beauty of the surrounding country and the picturesque of the city itself. There are several ancient buildings, an arsenal with old armor, a gallery of art, a museum of antiquities and numerous interesting modern buildings. One of the chief points of interest is the famous Lion of Lucerne (See SWISS GUARDS). Population in 1900, 29,255.

Lucerne, LAKE OF (German, *Vierwaldstätter See*, or Lake of the Four Forest Cantons), a Swiss Lake, bounded by the cantons of Uri, Schwyz, Unterwalden and Lucerne, and noted for its magnificent scenery and historical associations. It is nearly in the shape of a cross, the bays of Lucerne, Küssnacht and Alpnach forming the head and arms, while the foot is formed by the bay of Buochs and the lake of Uri. Its length from Lucerne to Flüelen is 23 miles; from Alpnach to Küssnacht, at the extremities of the arms, about 14 miles; its width is from $\frac{1}{2}$ to 2 miles, and its greatest depth is 700 feet. It is a favorite resort for tourists.

Lu-Chu. See LOO-CHOO.

Lucian, lu'shan (about 120—about 200), a Greek satirist and humorist. Little is known of his life, but he is said to have made money as a rhetorician or a lawyer, to have spent much time in traveling and to have lived for long intervals in Athens. Those of his works which are still in existence are critical, satirical, rhetorical and narrative, and they are mostly in the form of dialogue. The most popular are those known as *Dialogues of the Gods* and *Dialogues of the Dead*. Lucian stands as one of the world's greatest prose writers and as the wittiest of the ancients.

Lucifer, lu'se fur, (in Greek, *Phōsphoros*, meaning *light-bearer*), a name anciently given to the planet Venus, as the morning star. The term is used figuratively by Isaiah (xiv, 12) and is applied to the Babylonian king, but it was mistaken by the commentators for a reference to Satan.

Lucilius, lu sil'i us, CAIUS (148-103 B. C.), a Roman poet, grand-uncle to Pompey the Great. He is considered the inventor of Roman satire, because he first gave it the form under which it was carried to perfection by Horace, Juvenal and Persius. Of thirty satires which he wrote, only some fragments have been preserved.

Lucknow or **Lakhnau**, a city of British India, capital of Oudh, 540 mi. w. n. w. of Calcutta. It ranks fourth in size among British

Indian cities, being next after Calcutta, Madras and Bombay. Although its streets are narrow and dirty and many of its buildings are small and mean, the city is from a distance picturesque and imposing in appearance, as there are minarets and domes on many of the larger buildings. Lucknow was one of the chief scenes of the Sepoy mutiny in 1857. At the beginning of the mutiny the residency was fortified by Sir Henry Lawrence, and after his death it was closely besieged by the rebels till relief was brought by Havelock and Outram. The relieving force was only a small one, however, and the British were again besieged. In the middle of October, Sir Colin Campbell gained possession of the place after severe fighting and made it possible for the garrison to leave the city. In March, 1858, the British permanently recovered the town. Population in 1901, 264,049.

Lucretia, lu kre'she ah, in Roman legendary history, the virtuous wife of Brutus, who was outraged by Sextus, son of Tarquinius Superbus, king of Rome. After telling her husband and father of her wrong, she stabbed herself, and her death was the signal for a revolution, by which the Tarquins were expelled from Rome and a republic was formed.

Lucretius, lu kre'she us, TITUS CARUS (about 99—about 55 B. C.), a Roman philosophic poet. About his life almost nothing is known, but he is said to have died by his own hand. He is admitted to be one of the greatest of Roman poets for descriptive beauty and elevated sentiment. We possess a didactic poem of his composition, in six books, *De Rerum Natura* (On the Nature of Things).

Lucullus, lu kul'lus, LUCIUS LICINIUS (about 110-57 B. C.), a Roman naval and military commander. He distinguished himself greatly in his campaigns against Mithridates, king of Pontus, from the time of Sulla to 66 B. C., when he was supplanted by Pompey. He thenceforward lived in luxurious retirement on the coast of Campania. His house, which contained a valuable library and works of art, was freely opened to learned men and philosophers.

Lud'ington, MICHAEL, the county-seat of Mason co., 105 mi. n. w. of Grand Rapids, on Lake Michigan, at the mouth of the Marquette River, and on the Pere Marquette and several other railroads. The manufacturing and shipping of lumber are the principal industries, and there is also a large trade in grain, fruit and salt. The manufactures include game boards, furni-

ture and clothespins. The city is in a beautiful lake region affording good fishing, and it has become a popular summer resort. The grounds and cottages of the Epworth League assembly are at Epworth Heights, near the town. Ludington was settled in 1851 and was chartered as a city in 1874. Population in 1904, 7259.

Lud'low, WILLIAM (1843-1901), an American soldier, born at Islip, Long Island, educated at West Point Military Academy. He served in the Georgia campaign in 1864, was assistant engineer to Sherman's army during the march to the sea and was brevetted major and lieutenant colonel for gallantry. From 1872 to 1876 he was chief engineer in the Black Hills and Yellowstone expedition, and he held many other important positions. He took an active part in the Spanish-American War, commanded the right wing at Santiago and was made military governor of Havana. In December, 1899, he was ordered to the Philippines, but was obliged to return on account of ill health.

Ludwigshafen, lood'viKs hah'fen, a Bavarian town in the Palatinate, across the Rhine from Mannheim. Although the chemical works constitute the chief industry of the town, there are, besides, manufactures of vinegar, spirits, wagons, machinery and artificial flowers. Population in 1900, 61,914.

Luke, SAINT, the evangelist, author of the Gospel which bears his name and of the *Acts of the Apostles*. He was probably born at Antioch, in Syria, and was taught the science of medicine. He is supposed to have been one of the seventy disciples and was also one of the two who journeyed to Emmaus with Jesus after the resurrection (*Luke* XXIV, 13-35). He was for several years a companion of the apostle Paul in his travels, so that in the *Acts of the Apostles* he relates what he himself had seen and participated in.

Lumba'go, rheumatism or rheumatic pains affecting the muscles of the loins. The disease is caused usually by colds and exposure and is likely to recur after the first attack and may even become chronic. The pains may be sharp and intermittent or dull and steady. The attack lasts from a few hours to several weeks and often disables and weakens the sufferer for longer periods. Warmth and rest constitute the best treatment. Pressure upon the affected muscles often gives relief.

Lum'ber, timber manufactured for building purposes. The most important forms in which lumber exists are logs, telegraph poles, boards,

planks, joists, shingles, railroad ties and lath. Its manufacture constitutes one of the most important, as well as one of the most extensive, industries of the world. The leading lumber-producing countries are the United States, Canada, Sweden, Russia, Germany and France. India, the Chinese Empire and the Kongo region also produce lumber in large quantities.

In some of the lumber regions of the United States the cutting of timber is carried on only during the winter months, because it is at this time that the logs can be more economically transported than at other seasons. The lumbermen during the logging time live in camps, which are usually constructed of logs and consist of buildings in which the men sleep, a kitchen and dining room, one or more stables for the horses, and a blacksmith shop. The men of the camp are organized into squads, each in charge of a foreman and assigned to a special line of work. One squad fells the trees, which is done by sawing them off near the ground, instead of chopping them, as formerly. Another squad cuts trees into logs; still another hauls the logs to the river or to another suitable place, from which they are transported to the mills, while another may have charge of the roads over which the logs are hauled. The general foreman, or superintendent, has oversight of all the work, selects the trees to be cut and sees that each squad performs the work assigned to it in a satisfactory manner.

Formerly the logs were hauled to the nearest stream or lake, from which they were carried with the high water down the river to the mills, but as the timber near the streams was cut off, it became more economical to employ railways for transporting the logs, so that now they are often loaded directly upon cars constructed for the purpose and hauled to their destination. Because the manufactured lumber can be transported more cheaply, steam sawmills are usually erected in the midst of the lumber region, and the logs are worked up near where they are cut. Transportation by raft is used to some extent on the Great Lakes and on the Pacific Ocean. Logs are bound together in large rafts, usually rectangular in form and longer than they are wide. These are towed by tugboats or steamers. This method of transportation is convenient and inexpensive, and when the lumber is cut near the water, it can be used very effectively.

The important lumber regions of the United States are in Maine, northern Michigan, Wisconsin and Minnesota, around the Great Lakes,

in the forest regions of North Carolina, Georgia, Tennessee and Arkansas, and in Washington, Oregon and the northern part of California. Because of the immense size of the trees in the last-named region, the methods employed vary greatly from those in the other regions. Here horses or oxen are of but little use in moving logs, and hoisting engines, traction engines and railways are very generally employed for the purpose of moving the logs and for transporting them to the mills. Some of the trees are of such size that the logs have to be split into blocks before they can be sawed.

The sawmills contain all the machinery necessary for working the logs into the finished lumber. Circular saws, band saws and gang saws are common in the largest mills (See SAW). The gang saw consists of a number of saws attached to an iron frame which moves up and down. The space between the saws is the same as is desired for the thickness of the board or plank to be cut, and each gang contains enough saws to convert the log into lumber as it passes through them. While a mill of this pattern seems to work slowly, yet because of the number of saws employed it manufactures more lumber in the same time than any other mill. All of the waste product is used. The slabs and poor boards are cut into lath; the bark, sawdust and other waste go to feed the fire in the boiler, so that practically nothing is wasted. Since lumber shrinks in drying, it must be thoroughly seasoned before it can be used, and many large mills contain drying kilns, or chambers in which the boards are stacked and subjected to the influence of hot air for a number of days. Some mills also contain planing mills and other finishing machinery, so that the lumber can be manufactured into any desired article before leaving the mill.

Lumbering is the fourth industry in importance in the United States, and the value of the lumber produced in the country yearly is about \$567,000,000. The industry gives employment to nearly 400,000 men. The leading states are Wisconsin, Michigan, Minnesota, Pennsylvania and Washington. See FORESTS; OAK; PINE; MAPLE.

Lumpfish or **Lump'sucker**, a fish, so named from the clumsiness of its form. The back is arched and sharp, the belly flat, the body covered with numerous bony tubercles and the ventral fins modified into a sucker, by means of which the fish can stick firmly to anything. Before the spawning season it is of a brilliant

crimson color, mingled with orange, purple and blue, but afterward it changes to a dull blue or lead color. It sometimes weighs seven pounds, and its flesh is very fine at some seasons, though insipid at others.

Lumpy Jaw or **Lump Jaw**, a disease of cattle, usually manifested by the appearance of swellings on the lower jaw, though it affects other parts of the body. It is caused by a fungus which is found on grasses and on the awns of barley, spears of oats and other grains. These occasionally penetrate the gums of cattle, and the fungus lodges in the tissue and grows, producing tumors or abscesses. When opened and examined, these are found to contain minute grains, varying in color from pale yellow to a sulphur yellow. These granules are imbedded in the soft tissue composing the tumor or in the pus of the abscess. The presence of the fungus causes sufficient irritation to propagate these inflammatory growths. The disease progresses rather slowly, but unless checked it often produces ulceration of the jawbone, causing displacements or even loss of teeth. Without assistance the animals seldom recover.

It is supposed that the disease is contracted from food infected with the fungus. The treatment consists in lancing or removing the tumors and also in treating with solutions of iodide of potassium and iodine. The latter method is usually the more effective and has the advantage that it can be applied by any one, while the surgical operation can be undertaken only by a trained veterinarian.

Lu'na, the Latin name for the moon, known to the Greeks as *Selene*. Her worship is said to have been introduced among the Romans in the time of Romulus.

Lunacy, *lu'na sy*. In law, "a lunatic," says Blackstone, "is one that hath had understanding, but by disease, grief, or other accident, hath lost the use of his reason." In the United States, the legislature exercises a protective authority over idiots and lunatics. The statutes of the different states provide that such persons may be put under guardianship, provided lunacy is proved before a competent court. Until the contrary is shown, every man is presumed to be sound of mind. In criminal cases lunatics are not chargeable for their acts, but they may be sued and can sue, in the name of their guardians, for civil wrongs. See INSANITY.

Lu'nar Caus'tic, a chemical preparation, composed of nitrate of silver, mixed with a little nitrate of potassium or silver chloride, and made

into little sticks, which are white or grayish in color and turn black on exposure to the air. Lunar caustic is used extensively in surgery, because of its antiseptic qualities and its power to burn away diseased tissue or such formations as the membrane in diphtheria.

Lun'dy, BENJAMIN (1789-1839), an American abolitionist of Quaker extraction, born in Suffolk, N. J. At the age of nineteen he emigrated to Ohio, where he soon became an opponent of slavery and the methods of its advocates. There he organized the Union Humane Society, and after spending a short time in Missouri he founded at Mount Pleasant, Ohio, the *Genius of Universal Emancipation*. This he removed finally to Baltimore, Md., where it gained wide influence as an anti-slavery organ. He was joined in editing the paper in 1829 by William Lloyd Garrison. The latter's views were more radical than Lundy's and soon brought the paper into disrepute among conservative abolitionists. The partnership was dissolved, and Lundy removed his office to Washington, where the paper soon failed. Lundy started the *National Inquirer* in Philadelphia in 1836, but retired from its management two years later. He also lost most of his property at the hands of a mob in Philadelphia and removed to Lowell, Ill., where he reëstablished the *Genius of Universal Emancipation*, but died within a few months.

Lun'dy's Lane, BATTLE OF, an important battle of the War of 1812, fought at Lundy's Lane, about one and a half miles from Niagara Falls on the Canadian shore, July 25, 1814. The American force was commanded first by General Scott and then by General Jacob Brown and faced a superior force under General Reall. The Americans were the aggressors and first gained an important advantage, but the result after an all-day's struggle was probably a drawn battle. The loss on each side was about 850.

Lungs, THE, organs of respiration, which occupy, in man, the greater part of the cavity of the chest and are separated from each other by the oesophagus, the heart and the large blood vessels. Though these organs occupy so large a space they are the lightest, according to size, of any in the body, weighing in man about three and one-half pounds, in woman two and three-fourths pounds. The color varies with the age of the individual, being pinkish at birth, slate colored and mottled in adult life and of a still darker tint in old age. Each lung is partially subdivided into lobes, the right into three, the

left into two, and each lobe is made up of a large number of tiny lobules, each minute part consisting of bronchial tubes (See BRONCHI), pulmonary lobules, blood vessels, lymphatics and nerves imbedded in fibrous and elastic tissue. The root of the lung is the place where the bronchial tubes and blood vessels enter it, at about the middle of the inner surface. The minute terminal branches of a bronchial tube widen out, and the folds of their walls make the air cells. A dense network of capillaries lies outside the cells, so that between the air in the cells and the blood in the capillaries there are but the two very thin walls, and often there is only a single layer of capillaries between adjoining cells, thus exposing both sides of the blood vessels to the air. The blood vessels of the lung belong to two distinct systems, the *bronchial*, which give nourishment to the lung proper, and the *pulmonary*, which expose the venous blood to the lungs for its arterialization. The pulmonary artery carrying venous blood from the heart to the lungs divides under the arch of the aorta, enters the root of the lungs with the bronchi, divides and subdivides, following the divisions of the bronchi, and finally forms the capillary network before mentioned. The blood, while passing through these capillaries, is changed to pure arterial blood. It is then conveyed through the converging pulmonary veins to the left auricle of the heart. See CIRCULATION; PLEURA; RESPIRATION.

Lungwort, *lung'wurt*, a common garden flower which has red and purple tubular blossoms and leaves speckled like diseased lungs. It was formerly believed to be valuable as a remedy in diseases of the lungs. A kind of hawkweed and a lichen receive the same name.

Lu'perca'lia, a Roman festival, celebrated annually in honor of Lupercus, an ancient pastoral god, afterward identified with Pan. It was celebrated on February 15 at the Lupercal, a grotto in the Palatine Hill at Rome. Goats were sacrificed, and two youths, arrayed in goat skins, ran through the streets of the city striking with leather thongs all the persons they met.

Lup'ine, a very extensive genus of hardy plants, some of which are cultivated in gardens for the sake of their gaily-colored flowers.

Luray' Caverns, a series of underground galleries in Page County, Va., near Luray. Most of the hundreds of chambers have not yet been explored. The cave is considerably smaller than the Mammoth Cave of Kentucky, as it

underlies only about 100 acres, but it affords a wonderful display of stalactites.

Lurch'er, a very intelligent dog that lies in wait for small game, such as hares, rabbits and partridges, drives them into nets, runs them down or seizes them. This species of dog is said to be descended from the shepherd's dog and the greyhound, and in England, where it is best known, it is more used by poachers than by sportsmen.

Lute, a stringed musical instrument, similar to a guitar, formerly very popular in Europe. It consists of four parts, namely, the table or belly, with a large round hole in the middle; the body, ribbed like a melon, with nine or ten ribs, or divisions; the neck, which has nine or ten stops, or frets, which divide the strings into semitones; and the head, or cross, in which are fitted the pegs, or screws, for tuning the strings, of which there are five or six pairs, each pair tuned in octaves or in unison. The strings are struck by the fingers of the right hand and are stopped on the frets by those of the left.

Lu'ther, MARTIN (1483-1546), a German reformer, born at Eisleben, Saxony. He was of poor parentage, his father being a miner. When but twenty years of age he graduated as master of philosophy at Erfurt in Thuringia; in 1505 he entered the monastery of the Augustinians at Erfurt and two years later was consecrated priest. The following year, by the influence of his patron, Staupitz, who was district vicar of the order, Luther was made professor of philosophy in the new University of Wittenberg. At first he lectured upon the philosophy of Aristotle, but soon turned his attention to the Bible, and his lectures on this subject attracted so much attention that Staupitz prevailed upon him to preach regularly in the monastery church at Wittenberg. In 1512, upon his return from a visit to Rome in the interests of his order, he was made doctor of theology and began his famous lectures on Paul's *Epistles*. His first original work, the *Exposition of the Seven Penitential Psalms*, was published in 1517. Meanwhile, he had been made district vicar of the Augustinians and then preached not only in the convent chapel, but also in the parish church.

During these years he had worked zealously for the Church and in the interests of his order, but in 1517 a Dominican priest, Johann Tetzel, appeared in the vicinity of Wittenberg, selling indulgences, the proceeds of which were to go toward the building of Saint Peter's. Just at

this time the dedication of the Schloss-kirche was being celebrated at Wittenberg, and, as it was customary upon such days to nail upon the church doors bulletins of general interest to the parish, Luther on the evening before the fête-day published upon the door of the Schloss-kirche his ninety-five theses, which led to the movement known as the Protestant Reformation. These theses were called forth by Tetzel's abuse of the church doctrine regulating indulgences. Their tone was, however, moderate, and it seems that at this time Luther contemplated no break with the Church. By means of the press, the theses were scattered with remarkable rapidity through Europe, and all the continent was soon plunged into a tumult of controversy. Luther, meanwhile, devoted himself to the further study of the Bible, Church history and canon law, in order to defend the position he had taken. His study resulted in his drifting further and further from the Church. His public utterances and writings became bolder, and he was soon attacking the entire system and body of teachings of the Church of Rome. At first the pope did not regard the matter as of serious import; but at length, being convinced that Luther's influence was becoming dangerous, he issued a bull against him and his friends. Luther's writings were condemned as heretical, and he himself, if he did not recant his errors in sixty days, was to be seized and sent to Rome to be tried for heresy. Luther publicly burned this communication.

In 1521 the Diet of Worms, an assembly of the princes, nobles and clergy of Germany, was convened by the emperor Charles V to deliberate upon State affairs in general and especially upon matters touching the great religious controversy. Luther was summoned before this body and called upon to recant his errors. Refusing to do so, he was pronounced a heretic and outlaw, but was allowed to depart in safety. Frederick, elector of Saxony, conveyed him privately to the Wartburg castle, where he remained for ten months in seclusion and translated the New Testament into German. Meanwhile, serious troubles arose from the excesses of some professed followers of Luther. Castles and monasteries were sacked, and horrible outrages were perpetrated. Although a legal outlaw, Luther now came forth, temporarily checked the disturbance, then resumed his work in the Church and university; and when several years later trouble broke out afresh, he made a tour through the neighboring towns, preaching a

crusade against the image breakers. His history from this time is identical with that of the Reformation. It is thought that the rapidity with which his doctrines gained ground was due as much to his hymns as to his preaching. *A Mighty Fortress is Our God* is sometimes known as the "battle hymn of the Reformation." In 1524 Luther married Katharine von Bora, a former nun, who for several years had been a believer in his doctrines. In the same year he established a school at Eisleben. From 1526 to 1529 he was engaged in the preparation of a new church service. His translation of the Bible in 1534 permanently established the literary language of Germany. The life of Luther after the drawing up of the Augsburg Confession contains little of interest. See REFORMATION. Consult E. H. Jacobs's *Life of Luther*.

Lu'therans, the name given in derision by the opponents of the Reformation to those who adopted the theological doctrines of Luther. Luther himself protested against this name, as his intention had been, not to form a new Church, but to reform abuses in the Church then existing. The Augsburg Confession set forth the doctrines which are held by the Lutherans of to-day (See AUGSBURG CONFESSION). The Lutheran creed includes the doctrines of "justification by faith alone, universal depravity, the vicarious atonement, regeneration, progressive sanctification, a true sacramental, but not a material, presence of Christ in the Lord's Supper, and the use of both the Bible and the sacraments as means of grace." Lutheranism is the prevailing form of Protestantism in Germany and is the national religion of Denmark, Sweden and Norway.

Lüt'tzen, **BATTLES OF**. The first Battle of Lützen was fought in November, 1632, between the Swedes, under Gustavus Adolphus, and the imperial troops, under Wallenstein. The Swedes, although they had the smaller force, were victorious after a stubbornly-fought battle, but Gustavus Adolphus was killed. On May 2, 1813, occurred the second Battle of Lützen, in which Napoleon defeated General Wittgenstein with a force of Russians and Prussians. The loss to each side was approximately 20,000.

Luxembourg, *looks'ahN boor'*, **Palace**, a beautiful building in the southern part of Paris, celebrated for its elegant architecture. It was built in the first part of the seventeenth century, but has been since that time changed very considerably, though the original style and character have been preserved. Since 1879 it has been used as a Senate building, and besides this it

has served as a royal or public picture gallery. It has now the largest and most important collection of modern art, both sculpture and painting, which is contained in a small neighboring building called the Museum of Luxembourg. The palace is French in design, though modeled after the Pitti Palace in Florence. The walls and ceiling decorations are magnificent, and the rooms are adorned with beautiful paintings, the masterpieces of many great artists. The Luxembourg gardens, the most noted gardens in France, are large and beautiful and are used as a public park.

Lux'emburg, a grand duchy of the Netherlands, bounded on the n. and e. by Rhenish Prussia, on the s. by Lorraine and France and on the w. by Belgium. It is about 998 square miles in area. Grain, fruit and wine are produced, cattle and horses are exported and iron ore is mined and smelted. The inhabitants are mostly of German origin, but French is the language of the educated classes and of business. The capital of the duchy is Luxembourg. Luxembourg is a member of the German zollverein.

Lux'or. See THEBES.

Luzon' (Spanish pronunciation, *loo hohn'*) See PHILIPPINE ISLANDS.

Lyceum, *li se'um*, an academy at Athens, in which Aristotle explained his philosophy. In modern times the name *lyceum* has been given to the schools intended to prepare young men for the universities, also to organizations which maintain lecture courses of a popular or technical nature.

Lycia, *lish'eah*, an ancient maritime province, in the southern part of Asia Minor. It was colonized by the Greeks at a very early period, and its historical inhabitants were Greeks, though with a mixture of aboriginal blood. Lycia was conquered in the sixth century B. C. by Persia and was afterward in turn ruled by Macedonia, Egypt, Syria, Rome and Turkey.

Lycurgus, *li kur'gus*, the great lawgiver of the Spartans, who flourished about 900 B. C. He traveled into Crete, Egypt and Asia and thus prepared himself to give Sparta the laws which have rendered his name immortal. His object was to regulate the manners, as well as the government, and to form a warrior nation, in which no private interest should prevail over the public good. See SPARTA.

Lyd'ia, in ancient geography, a large and fertile country of Asia Minor. It attained its highest prosperity in the seventh and sixth centuries B. C., especially under Croesus, who was

conquered by the Persians under Cyrus, in 546 B. C. The Lydians are credited with the invention of certain musical instruments, the art of dyeing wool and the art of smelting and working ore. Sardis was the capital of Lydia.

Ly'ell, CHARLES, Sir (1797-1875), a British geologist, born at Kinnordy, Scotland. He was educated at Oxford and began the study of law, but afterward resolved to devote his time and fortune to geological research. For this purpose he visited the continent of Europe and the United States. His first important work was the *Principles of Geology*, and a portion of this book afterward formed the basis of the *Elements of Geology*. Another important work was the *Antiquity of Man*, in which he summarized the evidence in favor of the theory that the race of man was much older than was currently believed. Lyell is considered by many to be the founder of modern geological science.

Lymph, *limf*, a colorless, nearly transparent fluid, found in the lymphatics. It has a saltish taste and, on examination with the microscope, is seen to contain corpuscles resembling quite closely white blood corpuscles. The composition of lymph seems to be almost the same as that of the blood, with the exception that it does not contain any of the coloring matter found in blood. Lymph is absorbed by the *villi* of the small intestines, passes through the lacteals into the *receptaculum chyli* and thence into the thoracic duct. Its function is to provide nourishment for the growth and repair of the tissues, as well as for the storage of energy. The formation of lymph is continuous, and it is absorbed by the tissues from the capillaries. Physiologists suppose that the amount formed is regulated to some extent by the pressure in the lymphatic vessels and that this pressure is controlled by the absorption by the tissues. See LACTEALS; LYMPHATICS.

Lymphatics, *lim fə'tiks*, minute, transparent tubes, which originate in lymph capillaries, found in all parts of the body except the brain, eye, spinal cord and tendons. They are so abundantly supplied with valves that when filled with lymph they present a beaded appearance. In the course of these lymphatics are glands, through which the lymph passes on its way to the blood vessels of the neck. The valves are abundant in the armpit and the groin, along the great vessels of the neck, thorax and abdomen, in the arm as far as the elbow, and under the knee. It is only after passing through these glands that the lymph is ready to enter the blood. The

lymphatics of the left side of the body empty their contents through the thoracic duct into the left subclavian vein; those on the right side into the right subclavian vein. See LACTEALS; LYMPH.

Lynch'burg, VA., a city in Campbell co., 124 mi. w. of Richmond, on the James River and on the Chesapeake & Ohio, the Norfolk & Western and the Southern railroads. It has a picturesque location on the hills along the river, where the Blue Ridge and the peaks of Otter Mountains make a beautiful background. The surrounding region is agricultural and contains deposits of coal, iron and granite. The main industries include large tobacco factories, iron and brass foundries, flour and cotton mills, shoe factories and tile works. Randolph Macon Women's College and the Miller Female Orphan Asylum are located here. The place was settled in 1786 and was incorporated in 1823. It was an important base of supplies for the Confederate army during the Civil War. Population in 1900, 18,891.

Lynch Law, the practice of punishing men for offenses, through private, unauthorized means, without legal trial. The origin of the phrase was in the name of one Charles Lynch of Virginia, who adopted this mode of punishing offenders. Lynchings are most frequent in the South and West, and negroes are more often the victims than whites. There is a growing sentiment in opposition to lynch law, and the number of cases in 1904, eighty-six, is the lowest recorded in fifteen years.

Lynn, MASS., a city in Essex co., 10 mi. n. e. of Boston, on Massachusetts Bay and on the Boston & Maine and the Boston, Revere Beach and Lynn railroads. Lynn Woods and Lynn Beach are features of interest. The city has also a large public library, two high schools, a city hall, the Lynn Hospital and Orphanage and the Lynn Home for Aged Women. The most important industry is the manufacture of shoes. There are more than 280 shoe factories, employing about 11,000 people. Other industries have also been developed, including the manufacture of machinery, electrical appliances, leather, patent medicines and other goods. The place was settled in 1629 and was known as Saugus until 1637. Population in 1905, 77,042.

Lynx, the name given to different wild cats found in North America, Europe, and Asia, north of the Himalaya Mountains. The common lynx of North America is from 30 to 40 inches in length and has stout limbs and a short, thick tail. The species found in the north is

Lyon

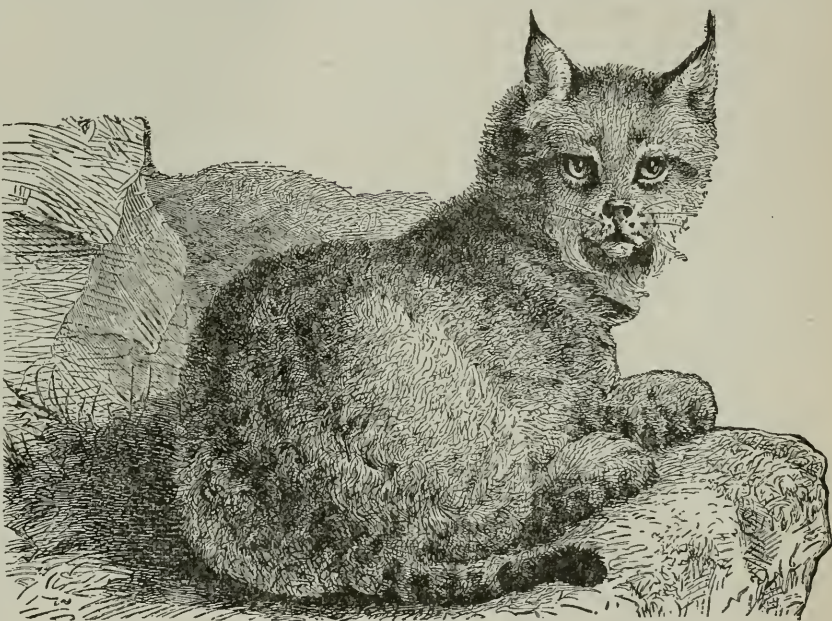
known as the *Canada*, or *red lynx*, and that in the south as the *southern lynx*, or *bob cat*. The Canada lynx is of a grizzled, brownish-gray color and has tufts of black hair on the tips of its ears and at the end of its tail. The lower part of the animal is white. The bob cat is nearer a reddish brown, especially in the summer, and its fur is marked with spots and lines, which are most distinct about the head. The lynx feeds upon small animals, rats, mice and sometimes upon sheep and goats. It is especially fond of poultry, and in some localities it is a pest to the farmer. The animals seek their prey by night, and during the day they sleep in small caves or hollow trees. The fur is of good quality and finds a ready sale. For this reason and because of their depredations, these animals have been exterminated in most of the older states.

Ly'ou, MARY (1797-1849), an American educator, born at Butler, Mass., and educated at Sanderson Academy and Byfield Academy. On completing her education, she became a teacher in Sanderson Academy, and from the outset she was interested in the education of women. She was one of the founders of a seminary for girls, and had charge of the institution for a number of years; but she is best known as the founder and first principal of the Mount Holyoke Female Seminary at South Hadley, Mass. Under her management the school attained a high degree of excellence and a wide reputation. It was owing largely to her influence and her ideals concerning higher education for women that this school attained the reputation which it now holds.

Lyon, NATHANIEL (1818-1861), an American soldier, born in Ashford, Conn., and educated

Lyons

at West Point. He became lieutenant of infantry and served in the Seminole War, and for his gallant part in the chief battles of the Mexican War he was made captain. At the beginning of the Civil War he was stationed at Saint Louis, and by his prompt action he did much toward keeping Missouri on the Union side. He was killed at the Battle of Wilson's Creek and left his entire fortune, \$30,000, to the government, to aid in carrying on the war.



LYNX

Ly'ons, a city of France, the third in population, and the second in industrial importance, in the country. It is the capital of the Department of the Rhône, is 250 miles south-southeast of Paris and 160 miles north of the Mediterranean. Among its chief buildings are the Cathedral of Saint Jean, which dates from the fifteenth century; the Church of Ainay, which has a cupola supported by ancient Roman columns and a crypt believed to be of the ninth century; the Church of Saint Nizier, and the modern Church of Notre Dame de Fourvière.

Lyons carries on various industries, among them the manufacture of hats, books, perfume, soap and laces, but it is noted chiefly for its silk manufactures, which are the greatest in the world. The silk industry in the town and surrounding neighborhood gives employment to almost 250,000 people. There is a large trade by railway, river and canal. Lyons was a place

Lyons

of some importance when Gaul was invaded by Julius Caesar, and it remained the chief city of Gaul throughout the greater part of the life of the Empire. During the Middle Ages it did not lose at any time all of its importance, and Louis XIV greatly improved the city. While the French Revolution was in progress, the city suffered severely; thousands of its citizens were put to death by the emissaries of the Paris Convention, and its chief buildings were destroyed. Population in 1901, 459,099.

Lyons, GULF OF, a bay of the Mediterranean, on the southeastern coast of France. The principal ports on this gulf are Toulon, Marseilles and Cette.

Lyre, one of the most ancient stringed instruments of music, consisting of a frame, with two horn-like pieces rising from it, and a crosspiece between the horns, from which strings were stretched to the lower part of the frame. It is said to have had originally only three strings, but the number was afterward increased to seven, then to eleven and finally to sixteen. The lyre was common among the Egyptians, Assyrians and Greeks, and it was considered to be the favorite instrument of Apollo, the god of music and poetry.

Lyre Bird, a very peculiar bird, living only in Australasia, where there are but three species. These birds take their name from the remarkable tails of the males, which in shape and arrangement resemble somewhat an ancient lyre. The birds are brownish, about the size of small hens, and live principally upon the ground, whence they can leap to branches many feet above ground. When running, they spread their tails out horizontally. During the breeding season the male bird is very vain, and scraping out little hollows in the ground, it struts about or dances, with erect tail and drooping wings, and sings a loud, rather pleasing song.

Lyric Poetry, originally, poetry sung to, or suited for, the lyre; in modern usage, that class of poetry in which are expressed the poet's own thoughts and feelings, or the emotions attributed to another, as opposed to epic or dramatic poetry, to which a story of action is essential. There may be a lyrical element in other kinds of poetry, in epics or dramas, for example, but narrative and action have little to do with truly lyric poetry.

Among the most beautiful of English lyrics are the songs in Tennyson's *Princess*, "The Splendor falls on castle walls," "Sweet and Low," "Tears, idle tears," "As through the land at eve we went" and "Home they brought her

Lyric Poetry

warrior dead"; Wordsworth's *My Heart Leaps Up*, *The Daffodils* and *The Solitary Reaper*; Tennyson's *Break, Break, Break*, and *Crossing the Bar*; Holmes's *Chambered Nautilus*; Long-



LYRE BIRD

fellow's *Hymn to the Night*; Shelley's *Cloud*; Milton's *L'Allegro* and *Il Penseroso* and Burns's *Highland Mary* and *To Mary in Heaven*. Tennyson's "Tears, idle tears" is here given entire:

Tears, idle tears, I know not what they mean,
Tears from the depth of some divine despair
Rise in the heart, and gather to the eyes,
In looking on the happy autumn fields,
And thinking of the days that are no more.
Fresh as the first beam glittering on a sail,
That brings our friends up from the underworld,
Sad as the last which reddens over one
That sinks with all we love below the verge;
So sad, so fresh, the days that are no more.
Ah, sad and strange as in dark summer dawns
The earliest ripe of half-awaken'd birds
To dying ears when unto dying eyes
The casement slowly grows a glimmering square;
So sad, so strange, the days that are no more.
Dear as remembered kisses after death,
And sweet as those by hopeless fancy feign'd
On lips that are for others; deep as love,
Deep as first love, and wild with all regret;
O Death in Life, the days that are no more.

Lyander

Lysan'der (?-395 B. C.), a Spartan general who was appointed to the command of the Spartan fleet off the coast of Asia Minor in 407 B. C., during the Peloponnesian War. In 405 he defeated and captured the Athenian fleet off Aegospotamos, and thus put an end to the war. He was killed in a battle with the Thebans.

Lysimachia, *li se mak'e ah*, a genus of herbs, belonging to the primrose family. Four species occur in the United States, and many others in various parts of the world. They are usually leafy-stemmed and bear yellow flowers, which in some species are large and handsome. *Moneywort* is the common name of a pretty little trailing vine that forms dense mats and has been introduced into the United States from Europe. Its roundish, light-green leaves, bright yellow flowers and graceful trailing stems make it a favorite for growing in hanging baskets.

Lysip'pus, a Greek sculptor who flourished in Sicyon about 330 B. C., in the time of Alexander the Great. He worked only in bronze, in which he fashioned about fifteen hundred

Lytton

statues, none of which have been preserved except the *Apoxyomenos* in the Vatican. Lysippus claimed to represent the human figure as it seems to be to the eye, and not as it actually is. His statues were characterized by a small head, long legs and slender figure. He became famous by his statues of Zeus, Heracles, Helios and of Alexander the Great, whom he represented many times. Celebrated colossal statues of Lysippus were those of Helios in Rhodes, Zeus in Tarentum and Poseidon in Corinth.

Lyt'ton, EDWARD GEORGE EARLE LYTTON-BULWER. See BULWER-LYTTON, EDWARD GEORGE EARLE.

Lytton, EDWARD ROBERT BULWER (1831-1891), an English poet and statesman, son of the novelist Bulwer-Lytton. He early attained a reputation as a poet, under the name of Owen Meredith; and he published *Clytemnestra and Other Poems*, *Tännhauser*, *The Wanderer*, *Fables in Song*, *Glenaveril*, and the highly popular *Lucile*, besides prose works, including the life and letters of his father.



M is the thirteenth letter of the English alphabet. The character has come, with but little change, through the Greek and Latin from the Phoenician. The Phoenician name for the sound was the word meaning *water*, and it is probable that the character was originally a wavy line representing running water. *M* has in English but one sound, and it is silent only in a few foreign words, as *mnemonie*. In such words as *chasm*, when carelessly pronounced, it has almost the force of a vowel, as if the word were written *chazum*. As a symbol, *M* means 1000.

Maartens, *mahr'tens*, MAARTEN (1858), a Dutch novelist whose real name is J. M. W. van der Poorten-Schwartz. His early years were spent in England. He went to school in Germany and later attended a university in Holland. His stories are written in English, but they deal carefully and accurately with types of Dutch life. His works include *An Old Maid's Love*, *A Question of Taste*, *God's Fool*, *The Greater Gory* and *Dorothea*.

Ma'bie, HAMILTON WRIGHT (1846-), an American critic, editor and essayist, born at Coldspring, N. Y., educated at Williams College and at the law school of Columbia University. He was associated with the *Christian Union*, later called *The Outlook*, and he became associate editor of this periodical. Among his works, most of which are essays on nature and literature, are *My Study Fire*; *In the Forest of Arden*; *William Shakespeare: Poet, Dramatist and Man*, and *A Child of Nature*. Mr. Mabie has also gained great popularity as a lecturer.

Macao, *mah'kow*, a seaport town and Portuguese settlement in China, on a peninsula at the mouth of the Canton River, about 40 mi. from Hong Kong. It is considered the most healthful residence place in southeast Asia. The settlement has an area of about four square miles. Its principal export is tea, but its commerce, formerly extensive, has greatly declined since the rise of Hong Kong and the opening of

the Chinese treaty ports. It was in 1575 that the Portuguese first obtained permission to form a settlement and to trade at Macao, but not until 1887 was it recognized by the Chinese as Portuguese territory, over which China had no rights. Population, about 60,000.

Macaque, *ma kak'*, a genus of monkeys, found in Asia. They are all of medium size and have short tails. Their food consists of fruits, leaves, insects, frogs and lizards, and one species feeds almost entirely upon crabs. The *bonnet monkey* takes its name from a crest of hair on the crown of the head. In India the monkeys of this genus often become pests, because they rob fruit and provision stores. Some species are easily tamed and are frequently trained as pets. See BARBARY APE.

Mac'aro'ni, a preparation of wheat flour, used as food. In the manufacture of macaroni, only the hardest wheat of the best quality is used. The wheat is ground into a coarse flour and then sifted, and the flour is mixed into a dough with warm water. This is placed in a cylinder with a perforated base. A plunger is then placed in the cylinder and forces the dough out through the holes at the opposite end, forming the sticks of macaroni. These are cut into lengths of about ten feet and are then hung over frames to dry. The largest sticks form macaroni, while the smaller ones are known as *vermicelli* or *spaghetti*. Macaroni is manufactured in large quantities in Italy, where it is a national dish. It is also exported to Great Britain and the United States. It is manufactured to a considerable extent in France and in the United States. In the modern method, machinery is used and takes the place of much of the hand labor formerly necessary.

MacArthur, ARTHUR (1845-), an American soldier. He entered military service in 1862, with the twenty-fourth Wisconsin Infantry, took part in some important campaigns and in 1866 was commissioned first lieutenant in the regular army. At the beginning

Macassar

of the Spanish War he was made brigadier general of volunteers and was sent to Havana. The following year he was sent to the Philippines, and on the retirement of General Otis he became commander of the forces in the Philippines and military governor of the islands. He was made major general in 1901, assistant chief of staff in 1906, and later in the same year, lieutenant general.

Macas'sar, STRAIT OF, a body of water separating the islands of Borneo and Celebes and varying in width from 80 to 140 miles. It is about 400 miles long and contains a number of small islands.

Macaulay, *ma kaw'ly*, THOMAS BABINGTON, Lord Macaulay (1800-1859), an English historian, essayist and statesman, born at Rothley Temple, Leicestershire. In 1818 he entered Trinity College, Cambridge, where he obtained the Chancellor's medal for a poem on *Pompeii*, and a second time for a poem on *Evening*. He received a fellowship and took his M. A. degree in 1825. Before this he began to contribute to *Knight's Quarterly Magazine*, in which appeared his poems *The Spanish Armada*, *The Battle of Ivry* and *Moncontour*, and in 1825 he inaugurated his brilliant career in the *Edinburgh Review*, by his article on *Milton*. He was elected to Parliament in 1830 and was a most vigorous and effective partisan of the reform movement. During the years from 1834 to 1838 he was in India as a member of the Supreme Council there, and on his return he was again made a member of Parliament. In 1842 he published his *Lays of Ancient Rome*, and in 1848 appeared the first two of the five volumes of his *History of England from the Accession of James II.* This brilliant rhetorical exposition, although touched with partisanship and with a tendency to paradox, has attained the position of an English classic. Its popularity when it first appeared was phenomenal, and it is said that in America its sales exceeded those of any book except the Bible. Macaulay was created a peer in 1857, and at his death he was buried in Westminster Abbey. *The Life and Letters of Macaulay* has been published by his nephew, Sir George Otto Trevelyan.

Macaw', a genus of large parrots, found in South America. They are characterized by their strong powers of flight and their brilliant plumage. The tail is long and wedge-shaped, and the wings are long and pointed. The feet are strong, the cheeks naked and the bill short, strong and highly arched. The largest species,

Maccabees

the *great scarlet*, or *red and blue*, *macaw*, is more than three feet long. Its body is bright red, its tail is blue and crimson and its wings are greenish-blue and yellow. Its cheeks are bare, white and wrinkled, and the upper mandible of the beak is white. The *green macaw* is easily tamed, but none of the macaws can be taught to speak readily. Their notes are hoarse, and their screams are piercing; consequently, while prized for their brilliant coloring, they are somewhat annoying as pets. They feed upon fruits and seeds and are very destructive to corn and some other crops. See color plate, PARROT.

Macbeth' (?-1057), king of Scotland. In 1040, in a revolt against Duncan, king of Scotland, he killed the king and seized the throne. At the death of their father the sons of Duncan had taken refuge with their uncle Siward, earl of Northumberland, and with his aid they invaded Scotland in 1054; a battle was fought at Dunsinane, but it was not until 1057 that Macbeth was finally defeated and slain at Lumphanan, in Aberdeen. The legends which gradually gathered round the name of Macbeth were reproduced by Holinshed in his *Chronicle*, which is the source of Shakespeare's tragedy.

McBurney, CHARLES (1845-), a skilful American surgeon of New York City, born at Roxbury, Mass. He graduated from Harvard in 1866, and later, from the College of Physicians and Surgeons, New York. He became connected with the institution as instructor, demonstrator, lecturer and professor and retained the latter position for many years. He is a member of many medical societies and is on the staff of several of the great hospitals. Doctor McBurney is one of the most influential surgeons of his time.

Mac'cabees, a dynasty of ruling Jewish priests, of whom the first to come into prominence was Mattathias, who opposed the persecutions of Antiochus Epiphanes. With his sons and a few followers he destroyed heathen worship. When Mattathias died, 166 B. C., his sons Judas and Jonathan became successively leaders of the national movement. The last remaining member of the family was Simon, under whose rule trade and agriculture flourished. He was treacherously murdered by Ptolemy, his own son-in-law, 135 B. C.

Maccabees, KNIGHTS OF THE, a secret beneficiary and social order, founded Sept. 1, 1883. The so-called supreme tent, or headquarters of the order, is at Port Huron, Mich. Below this governing body are 8 grand tents and more than 5000 subordinate tents and

hives, including, all told, 325,000 members. The order pays death, accident, sickness and disability benefits, and since its organization it has dispersed more than \$25,000,000 in this way. The order known as the Ladies of the Maccabees is affiliated with this organization.

McCarthy, JUSTIN (1830-), a British novelist, historian and politician, born at Cork, Ireland. He traveled for three years in the United States, contributed to various English and American magazines and was connected with the New York *Independent*. After his return to England he held for years an editorial position on the staff of the *Daily News*. He was prominent in Parliament and was the leader of the Home Rule party after Parnell's overthrow. His writings include *History of Our Times*, *History of the Four Georges*, *The French Revolution* and *The Story of Gladstone's Life*.

McClellan, GEORGE BRINTON (1826-1885), an American general, born at Philadelphia. He was trained at West Point, served in the Mexican War and for gallant service at the battles of Contreras, Churubusco and Chapultepec was brevetted lieutenant and captain. In 1855 he was appointed to the commission which reported on the condition of European armies, and he watched the military operations during the Crimean War. At the outbreak of the Civil War he was appointed major general in the army, superseded McDowell in command of the Army of the Potomac after the first Battle of Bull Run and became commander in chief of the armies of the United States in November, 1861. In this capacity he organized the raw levies of the north and advanced toward Richmond the following spring. After the evacuation of Yorktown by the Confederates he led the Army of the Potomac in a series of engagements which terminated in the Seven Days' Battles, when he had to retire from his lines in front of Richmond. The result of this was his removal from the position of commander in chief. Afterward, when Lee advanced into Maryland, McClellan fought the battles of South Mountain and Antietam and compelled the Confederate forces to retire. The authorities at Washington were dissatisfied with his apparent slackness in following up this victory, and McClellan was relieved of his command and retired from the army. In 1864 he was nominated for the presidency, but was defeated by Lincoln. In 1877 he was elected governor of New Jersey.

McClelland, JOHN ALEXANDER (1812-1900), an American soldier, born in Brecken-

ridge County, Ky. He was taken in infancy to southern Illinois, where he received an elementary education, and in 1832 he was admitted to the bar. He served for a time in the Black Hawk War, entered journalism as editor of the Shawneetown (Ill.) *Democrat*, was elected to the state legislature and from 1843 to 1851 was a Democratic member of Congress. Again in 1859 he was elected to Congress from the Jacksonville district. At the outbreak of the Civil War he was appointed brigadier general and raised a force, which he commanded during the early months of the struggle at Belmont and Fort Donelson. He was appointed major general of volunteers in March, 1862, fought with distinction at the Battle of Shiloh and in January, 1863, superseded General Sherman in command of the Vicksburg expedition, but was soon afterward superseded by General Grant. In November, 1864, he resigned from the army and retired to the practice of his profession at Springfield, Ill.

McCloskey, JOHN (1810-1885), a Roman Catholic prelate, born in Brooklyn. He was educated at Mount Saint Mary's College, Emmitsburg, Md., and took postgraduate work in France and in Rome. On his return to New York he became pastor of Saint Joseph's Church, New York, served one year as president of Saint John's College, Fordham, N. Y., and was the first bishop of the diocese in Albany. While bishop at Albany, he built the cathedral, founded the theological seminary at Troy, introduced monastic orders, built churches and showed in many ways his executive ability. McCloskey was made archbishop of New York in 1864 and became cardinal in 1875.

McClure, *ma kloor'*, ALEXANDER KELLY (1828-), an American journalist and legislator, born in Perry County, Pa. He received only private instruction, and when fourteen years of age he was apprenticed to the tanner's trade; but four years later he became the editor of a small paper. He was admitted to the bar in 1856 and was elected to the legislature in the following year as a Republican. He returned to journalism at Chambersburg in 1862, but again practiced law in Philadelphia from 1868 to 1873 and was prominent in the Liberal Republican movement of 1872. In the following year he became editor in chief of the Philadelphia *Times* and continued in that position until April, 1901, when he retired. In 1904 he became chief clerk of the supreme court of Pennsylvania. He was the author of several



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books, including *Lincoln and Men of War Times, Our Presidents and How We Make Them and Recollections of Half a Century*.

McCook, ALEXANDER McDOWELL (1831-1903), an American soldier, born in Columbiana County, Ohio. He was educated at West Point, graduating in 1852, served in indian campaigns and as instructor at the military academy. At the opening of the Civil War he was made colonel of a volunteer regiment and at the Battle of Bull Run earned the brevet of major; later, for gallant service in Kentucky and Tennessee, he became a major general of volunteers. He also fought with Buell in Kentucky, at Murfreesboro and Chickamauga, and at the close of the war he was brevetted brigadier general and later major general in the regular army. He retired from active service in 1895, with the full rank of major general, and served in various special commissions until his death.

McCormick, CYRUS HALL (1809-1884), an American inventor, born in Virginia. In 1831 he built the reaping machine, which, with his improvements, has done so much for the cause of agriculture. In 1847 McCormick removed to Chicago, where the extensive works of the company were established. McCormick founded in Chicago the McCormick Theological Seminary for the Presbyterian Church and ended a professorship in Washington and Lee University in Virginia. See REAPING MACHINE.

McCosh, JAMES (1811-1894), a Scotch theologian, author and educator, born in Ayrshire and educated at the universities of Glasgow and Edinburgh. In 1868 he was elected president of the College of New Jersey (now Princeton University), which position he held for twenty years. During his administration the work of the college was greatly broadened and organized on a university basis, and the endowment was largely increased. Dr. McCosh was widely known through his lectures and writings on philosophical subjects and on education and psychology. Among his works best known in this country are *The Emotions, Psychology of the Cognitive Powers* and *Our Moral Nature*.

McCulloch, *ma kul'lo*, HUGH (1808-1895), an American financier, born at Kennebunkport, Maine, and educated at Bowdoin College. He began the practice of law at Fort Wayne, Ind., in 1833, but in 1845 he entered the banking business. In March, 1865, McCulloch was appointed secretary of the treasury by President Lincoln and retained the position through

Johnson's term. Upon retiring from office, he entered the firm of Jay Cooke & Co., which thereafter was known as Jay Cooke, McCulloch & Co., and engaged in banking in London. He again became secretary of the treasury in 1884, but retired the following year. He was the author of a valuable book entitled *Men and Measures of Half a Century*.

McCutcheon, JOHN TINNEY (1870-), an American cartoonist and special newspaper correspondent, born in Tippecanoe County, Indiana. He was educated at Purdue University, where he studied art under Prof. Ernest Kanufft. He was first brought to public notice by his cartoons while correspondent for the *Chicago Record* in 1896. He made tours of special service in India, Burmah, Siam, China, Korea and Japan. During the Spanish-American War he attended the military expeditions in the occupation of the Philippines. After this he went to South Africa and joined the Boers in the interest of his paper. In 1900 he furnished political cartoons for the *Record-Herald*, and in 1903 he became the cartoonist for the *Chicago Tribune*. He is the author of *Stories of Filipino Warfare and Cartoons by McCutcheon*. Among his famous cartoons is the series called *The Cartoons that Made Prince Henry Famous*.

Macdonald, FLORA (1722-1790), a Scottish woman, famous for the part which she took in the escape of Charles Edward Stuart after the Battle of Culloden (See STUART, CHARLES EDWARD). When, after this battle, he was in danger of capture by the troops of the English king, Flora rescued him, disguised him as her servant and helped him to escape to the Isle of Skye. In 1774, with her husband, Allan Macdonald, she came to America and settled in Fayetteville, N. C. Macdonald served during the Revolutionary War in the British army.

Macdonald, GEORGE (1824-1905), a Scottish novelist and poet, born at Huntley, Aberdeenshire, and educated at Aberdeen University. He was for several years a preacher, before he turned his attention to literature. Among his numerous novels are *David Elginbrod*, *Alec Forbes*, *Robert Falconer*, *Malcolm*, *The Marquis of Lossie* and *Salted with Fire*. He also published several volumes of verse and some stories for children, as *At the Back of the North Wind* and *The Princess and the Goblin*. In 1872-1873 he made a lecturing tour in the United States.

Macdonald, JOHN ALEXANDER, Sir (1815-1891), a Canadian statesman, born in Glasgow, Scotland. He went with his parents to Canada,

there studied law and was admitted to the bar. He was elected to the Dominion Parliament, became conspicuous as a Conservative leader and was chosen to a cabinet position in 1854. He became first premier of federated Canada in 1867, a position which he held until 1873, when he resigned. He resumed the office again in 1878 and retained it until his death. Macdonald was one of the British commissioners to settle the Alabama Claims (See ALABAMA, THE) and was one of the signers of the Treaty of Washington in 1871. He was an active promoter of the Canadian Pacific Railway and one of the prime movers in securing the confederation of the Canadian provinces. Consult Macpherson's *Life of Sir John Macdonald*.

McDonough, *mak don' o*, THOMAS (1783–1825), an American naval officer, born in Delaware. He entered the navy as midshipman in 1800, served in the Barbary War of 1801–1803 and in various minor commissions until the outbreak of the War of 1812. In that war he served first as lieutenant on the *Constitution*, but in September of 1812 he was commissioned to build a fleet on Lake Champlain. September 11, 1814, he successfully met a British fleet, superior to his own, under Captain George Downey. For this service he was made captain and was granted a gold medal by Congress. Later he commanded other vessels in the navy and died at sea.

McDow'ell, IRVIN (1818–1885), an American soldier, born at Columbus, Ohio, educated in France and at West Point. He served in the Mexican War and was brevetted captain for gallant service at Buena Vista. Soon after the opening of the Civil War, he was appointed brigadier general of volunteers and was placed in command of the Army of the Potomac, but suffered a defeat at the first Battle of Bull Run, which caused his removal. Later he commanded a corps under McClellan and was assigned to the defense of Washington, being made major general of volunteers. He was conspicuous at the battles of Cedar Mountain and Bull Run, but was later relieved from field duty. He asked for a court of inquiry, which acquitted him of all charges. In March, 1865, he was brevetted major general for his gallantry at Cedar Mountain and seven years later was given the full rank of major general. He retired from active service in 1882.

Mace, *mase*, an East Indian spice, the dried covering of the seed of the nutmeg, this covering being a fleshy, net-like envelope, somewhat

resembling the husk of a filbert. When fresh it is of a beautiful crimson hue. It is extremely fragrant and aromatic and is chiefly used in cooking or in pickles. See NUTMEG.

Macedonia, *mas e do'ny ah*, in ancient geography, a territory lying n. of the Aegean Sea and Thessaly, e. of Illyria and w. of Thrace. The name is now applied to no political division, but is often used in connection with the territory so called in ancient times. The country is mountainous, and was famous in ancient times for its gold and silver mines. The capital and chief city was Pella.

It is thought probable by most historians that the Macedonians were a Greek tribe which remained behind when other tribes migrated into Greece, but the customs and language became modified so that the Macedonians were a distinct people. The country did not become powerful until the accession of Philip II to the throne in 359 B. C. Under him Macedonia became leader of the Greek states (See GREECE, subhead *History*; PHILIP II of Macedon), and under Alexander the kingdom was immensely extended (See ALEXANDER THE GREAT). After the death of Alexander the Macedonian Empire was divided among his generals, the chief divisions being Macedonia, Egypt, Syria, Pergamos, Bithynia, Rhodes and the Greek states. In 146 B. C. Macedonia was made a Roman province, and in 395 A. D., when the Roman Empire was divided, it became a part of the Byzantine Empire, at the fall of which it came into the power of the Turks, part of whose territory it now forms. It is inhabited chiefly by Bulgarians, Turks, Greeks and Albanians. During the latter half of the eighteenth and the nineteenth century the Christian inhabitants of Macedonia frequently rose against the Turkish rule, but such revolts have always been put down with wholesale massacre. In 1903 both Russia and Austria demanded of Turkey certain reforms in the administration of Macedonia, but although the sultan promised to grant these, no steps were taken toward that end. The people rose in arms, and a desultory warfare was carried on throughout the entire summer. Late in the year the Macedonians were induced to lay down their arms and return to their homes.

Maceio, *mah say yo'*, or **Maçayo**, a Brazilian seaport, capital of the State of Alagoas, on the Atlantic coast. Its chief exports are cotton, horn and hides. Population, 12,000.

McEn'ery, SAMUEL DOUGLAS (1837–), an American lawyer and politician, born at

Monroe, La. He was educated at Spring Mill College, the United States Naval Academy and the University of Virginia and also studied law at Poughkeepsie, N. Y. He served as lieutenant in the Confederate army during the Civil War and afterward engaged in the practice of law. In 1879 he was elected lieutenant governor of his state, became governor two years later, on the death of Governor Wiltz, and was again elected in 1884. After serving two terms, he was appointed associate justice of the supreme court of the state, in 1888, where he served until elected to the United States Senate in 1897. He was reelected in 1903.

Maceo, *ma say'o*, ANTONIO (1848-1896), a Cuban patriot, born at Santiago de Cuba. He took part in the Cuban War from 1868 to 1878 and was made major general of cavalry. After traveling for a time he returned to Cuba, and in 1890 he attempted to start another revolution. At the outbreak of the Cuban rebellion in 1895, he joined the forces of Gomez and performed notable service. He was killed while making a reconnaissance.

MacFarren, GEORGE ALEXANDER, SIR (1813-1887), a musical composer, born in London. His chief operas are *The Devil's Opera*, *Don Quixote* and *Robin Hood*, one of his best works. Besides numerous cantatas and oratorios, he wrote a notable *Te Deum* and several important treatises upon music.

McGill' College and University, a co-educational institution, established at Montreal, Canada, in 1821, by the bequest of Hon. James McGill. The present organization includes the department of arts, to which women are admitted, the department of applied science, and departments of law and of medicine. There are also several divinity schools affiliated with the university. McGill is affiliated with the Universities of Oxford, Cambridge and Dublin, and it has a large number of affiliated schools and colleges in the Dominion. Its government is similar to that of English universities. The supreme authority rests in the governor-general of the Dominion. The executive officer is styled principal and is *ex officio* vice-chancellor. The chancellor is the president of the board of governors and is usually a non-resident officer. The faculty numbers over 75, and there are over 1000 students. The library contains 92,000 volumes, the endowment exceeds \$3,000,000, and the annual income is over \$410,000.

McGillivray, ALEXANDER (about 1740-1793), chief of the Creek indians, son of a Scotch

trader and a half-breed indian woman. He was educated at Charleston and for a time was engaged in business in Savannah, but later he became interested in the indian trade and was chosen "Emperor of the Creek Nation." In the Revolutionary War he took active part against the patriots, and he continued border hostilities until 1790, when he signed a treaty of peace for his tribe.

Machiavelli, *mah'kya vel'le*, NICCOLO (1469-1527), a distinguished Italian statesman and historian, born at Florence. For more than fourteen years he guided the destinies of the Florentine Republic, undertook embassies, concluded treaties and jealously guarded the rights and liberties of his native city. When the Medici returned to power in 1512, by the aid of the pope, Machiavelli was deprived of his office and retired to his country house. Here he devoted himself to literary labor, the chief results of which are found in his *History of Florence*, *Discourses upon the Ten First Books of Livy*, *The Prince*, by which he is best known, and the comedies of *La Mandragola* and *La Clizia*. The name of Machiavelli was long synonymous with all that is tortuous and treacherous in state affairs.

Machine Gun, a name given to any of those pieces of ordnance that are loaded and fired mechanically. They have usually a number of separate barrels. Such guns, while having their own use in warfare by land, are regarded as being of special value in marine warfare and are intended mainly for use against torpedo boats. As the range is limited, machine guns can never take the place of cannon and rifle, however deadly the guns may be at short range. The first machine gun to come into prominence was the French *mitrailleuse*, which was employed in the Franco-German War. The Gatling gun first appeared in the United States and was speedily adopted with modifications by Great Britain and other powers. Other guns of this kind are the Hotchkiss, the Nordenfeldt and the Gardner. As to rapidity of fire the Nordenfeldt has slightly the superiority; yet the two-barreled Gardner can fire 236 rounds, and the five-barrel Gardner, 330 rounds, in half a minute. In continuous work and ease and rapidity of fire, the Gardner gun has a marked superiority over the Nordenfeldt. The Hotchkiss gun fires heavier projectiles than the other machine guns. A more recent invention is the Maxim, which, after the first shot, continues to fire time after time by means of the power

derived from the explosion of each successive cartridge.

Mackay, *m'kay'*, JOHN WILLIAM (1831–1902), an American capitalist, born in Dublin, Ireland. He moved to New York in childhood, in 1851 went to California and in the following year to Nevada, where, in 1872, he was one of the discoverers of the Bonanza mines, of which he owned two-fifths. Their production has been enormous. In 1884, with James Gordon Bennett, he founded the Commercial Cable Company and Postal Telegraph Company and precipitated a long fight with the Western Union. Later he headed the company which constructed and laid the American Pacific Cable (See CABLE, SUBMARINE). He died in London.

McKees'port, PA., a city in Allegheny co., 15 mi. s. e. of Pittsburg, at the confluence of the Monongahela and the Youghiogheny rivers, and on the Pittsburg & Lake Erie, the Baltimore & Ohio and the Pennsylvania railroads. It is in a region having deposits of bituminous coal and natural gas, and it has a vast iron and steel industry. The National Tube Works has a very large plant here, employing between 8000 and 10,000 men. There are also manufactures of railroad cars, locomotives, glass and lumber products. The Douglass Industrial College is located here, and the city contains a hospital, a Carnegie library, a business college, a fine high school building, a Y. M. C. A. building, and about thirty churches. The place was settled in 1795 and was incorporated as a borough in 1842 and as a city in 1890. Population in 1900, 34,227.

McKees Rocks, PA., a borough in Allegheny co., on the Ohio River, opposite Allegheny, and on the Pittsburg & Lake Erie and the Pittsburg, Chartiers & Youghiogheny railroads. It has extensive railroad shops, iron and steel works, lumber and flour mills, glass works and other factories. The place was settled by John McKee in 1830 and was incorporated as a borough in 1892. The population has increased very rapidly during the last decade. Population in 1900, 6352.

McKen'na, JOSEPH (1843–), an American jurist and statesman, born in Philadelphia. His family removed to California in 1855, where he attended public schools, studied law and was admitted to the bar when twenty-two years old. He served several terms as prosecuting attorney and was a member of the state legislature. He was elected to Congress in 1884 and held his seat until 1892, when he was appointed United

States circuit judge by President Harrison. In 1897 he was appointed attorney-general, and in 1898 he became a justice of the United States Supreme Court.

Macken'zie, a district and territory of Canada, bounded on the n. by the Arctic Ocean; on the e. by Keewatin; on the s. by Keewatin, Saskatchewan, Alberta and British Columbia, and on the w. by Yukon. The area is over 500,000 square miles, and the population in 1901 was 5216. The country is generally low, sloping gradually toward the north. It contains a large number of lakes, chief among which are Great Bear Lake, Great Slave Lake, Aylmer Lake and Lake Dobaunt. The Mackenzie is the chief river; it flows across the western part of the territory and empties into the Arctic Ocean. In the north central part is the Copper Mine River, flowing into Coronation Gulf. While the region is suitable to certain lines of agriculture, it is as yet undeveloped.

Mackenzie, ALEXANDER (1822–1892), a Canadian statesman, born in Perthshire, Scotland. Originally a stone mason, he emigrated to Kingston, Canada, in 1842 and began business as a builder and contractor. In 1852 he was made editor of a Liberal newspaper, and he entered the Ontario parliament in 1861 and the Dominion parliament in 1867. He soon became leader of the Liberal party, and on the resignation of Sir John Macdonald in 1873, he became premier and retained office with great success till 1878. He remained in parliament until his death, heading the opposition for a time, and he many times refused the honor of knighthood.

Mackenzie, ALEXANDER, Sir (1755–1820), a Canadian explorer, born at Inverness, Scotland. He emigrated to Canada in 1775, and in the employ of the Northwest Fur Company he explored the great river named after him, from the western end of Great Slave Lake to the Arctic Ocean (1789). He made another expedition to the western coast (1792) and was the first white man to cross the Rocky Mountains.

Mackenzie, MORELL, Sir (1837–1892), an English physician and surgeon, famous for his successful operations on the larynx. When the German emperor Frederick III was attacked with cancer of the throat, Mackenzie became his physician and stayed with him to the end, notwithstanding the bitter opposition of German physicians. Among Mackenzie's published works are *A Manual of Diseases of the Throat and Nose*, *The Hygiene of the Vocal Organs*

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and an account of the fatal illness of the German emperor.

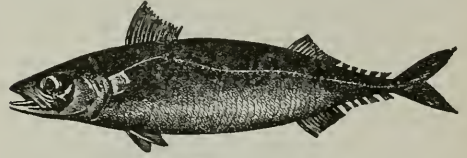
Mackenzie, WILLIAM LYON (1795–1861), a Canadian politician and statesman, specially noted as leader of the rebellion of 1837–1838. He was born in Scotland, but at the age of twenty-five he came to Upper Canada and settled at York, now Toronto. Four years later he established the *Colonial Advocate*, a paper in which he attacked the government and severely criticised many of its measures. He was elected to the legislature of Upper Canada in 1828 and was reelected three successive times, but was refused a seat because of an alleged libel on the ministry. In 1832 he visited England as a delegate to secure reforms in government and the redress of certain grievances. He was successful in his mission, and on his return he was chosen the first mayor of Toronto and was again elected to the legislature. During these years Mackenzie used his position and opportunity to create a strong sentiment against the existing government, and he publicly declared his sympathy with the inhabitants of Lower Canada (Province of Quebec), who were even more open in their opposition to the existing conditions than were the inhabitants of Upper Canada. In 1837 he led a movement to establish a new government and overthrow the existing order. He and his followers were defeated by a detachment of Canadian troops, and Mackenzie fled to the United States, where he established headquarters on Navy Island in the Niagara River and attempted to gather about him a following to invade Canada. Prompt action on the part of the United States authorities, however, prevented the success of his project, and he went to New York, where he remained several years, engaged in newspaper work. In 1849 general pardon was granted to all connected with this rebellion, and Mackenzie returned to Toronto. See CANADA, subhead *History*.

Mackenzie River, a large river in the Northwest Territories of Canada. It flows out of Great Slave Lake, first west, then north, finally northwest, and after a course of about 900 miles it falls into the Arctic Ocean by numerous mouths. Its principal affluents, including the feeders of Great Slave Lake, are the Athabasca, the Great Slave River, the Liard and the Peel, and it is navigable throughout its course. It was discovered by Alexander Mackenzie in 1789.

Mack'erele, one of the important food fishes, which inhabits almost the whole of the European

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seas and is found in tropical and temperate zones in other parts of the world. There are several species, but the common mackerel is the most important as a food fish. When full-grown it is from seventeen to eighteen inches long and weighs about three pounds. It is of a dark green color above, shading to a darker



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color below the water line. In the United States the center of the mackerel industry is at Gloucester and Yarmouth, Mass., whence mackerel fleets fish all along the coast. The greater part of the product is salted, but fresh mackerel is found on the market in cities near the coast.

Mackinac, mak'in aw, Island, an island and city in Mackinac co., Mich., 260 mi. n. by w. of Detroit and 320 mi. n. by e. from Chicago, in the Straits of Mackinac, at the northwest extremity of Lake Huron. The island is about 2 miles wide and 3 miles long and is a state park. Its southern end rises abruptly from the lake, and the bluff is the site of the old Fort Mackinac, which was an important military post previous to and during the War of 1812, but has long since been vacant. The city of Mackinac is at the foot of the bluff along the south shore of the island and is a noted summer resort, during the height of the season having from 8000 to 10,000 visitors. The city contains a number of large hotels and other structures erected for the pleasure and convenience of summer visitors. The regular inhabitants number about 675.

McKin'ley, MOUNT, the highest peak of North America, situated in the south central part of Alaska. Its height is 20,464 feet, and it is covered with snow and has extensive glaciers.

McKinley, WILLIAM (1843–1901), an American statesman, the twenty-fifth president of the United States. He was born in Niles, Ohio, and received his early education at the Poland Seminary, in the same state. In 1860 he entered Allegheny College, Meadville, Pa., but ill health compelled him to discontinue his studies the first year. After teaching school for a short period, he enlisted, in June, 1861, in the Twenty-third Ohio Infantry, under command of Colonel (subsequently General) W. S. Rosecrans, and

served through the war, gaining the rank of brevet major for gallantry at Antietam, Opequon Creek and Cedar Creek. He returned to Poland at the close of the war, began the study of law and was admitted to the bar in 1867.

Entering on the practice of law in Canton, Ohio, he soon became interested in politics and was known as a leading stump speaker in the state. He was elected prosecuting attorney in 1869, in 1876 member of Congress and was



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reelected successively until 1891. His service in Congress was notable for his advocacy of a high tariff, embodied in a bill called by his name, passed in 1890. He was elected governor of Ohio in 1891 and was reelected in 1893 by a majority of 80,000. His administrations as governor, though severely criticised for close relations with corporations and for exceptional regard for party advantage, were so efficient, in general, that McKinley became a popular party leader throughout the nation. In June, 1896, he was nominated by the Republican national convention at Saint Louis for president and was elected by a vote of 271 in the electoral college to 176 for William J. Bryan, his Democratic opponent. In the presidential canvass, men of both parties rallied to his support in opposition to the free silver movement represented by Mr. Bryan. His administration was notable for maintenance of a policy of expansion, both territorial and commercial, the former being emphasized by the Spanish-American war, the

annexation of the Philippines and the annexation of Hawaii, the latter by the negotiation of reciprocity treaties. The Dingley tariff law was also passed in 1897, and a bill establishing the gold standard became a law two years later.

McKinley was reelected in 1900 with increased majorities, receiving 292 of the 477 electoral votes. He had won a place in the hearts of many of his supporters as one of the most beloved of American statesmen; his second term had had an auspicious beginning, and his foreign and domestic policies were received with favor. On Sept. 6, 1901, while holding a public reception at the Pan-American Exposition at Buffalo, he was shot and fatally wounded by Leon Czolgosz, an anarchist. He died September 14 and was buried at Canton, Ohio, September 19. For five minutes at the hour of his interment, all business ceased throughout the land, and remarkable evidences of respect and affection were manifested by the peoples of other countries. As a statesman, McKinley was influenced, perhaps exceptionally, by the sentiment of his constituents, and it was rather his foresight in determining their views, than his own convictions, that made him a popular leader. However, his sincerity, his purity of character, his devotion to high ideals, and his generosity and tact well merited the prestige which he attained.

Maclaren, m'klair'en, IAN. See WATSON, JOHN.

McLaren, WILLIAM EDWARD (1831-1905), a Protestant Episcopal bishop, born in Geneva, N. Y., and educated at Jefferson College. After completing his education he began life as a journalist. Later he studied theology and was ordained a minister in the Presbyterian Church and sent as a missionary to Bogota. On his return he filled pastorates in Pittsburg, Pa., Detroit, Mich., and Peoria, Ill. He was led to change his religious views and became a minister in the Protestant Episcopal Church in 1872 and was stationed at Trinity Church, Cleveland, Ohio. Three years later he became bishop of Illinois, and when the diocese in that state was divided, he retained the northern part, known as the Diocese of Chicago. Bishop McLaren was the founder of the Western Theological Seminary, at Chicago, and Waterman Hall, a school for girls, at Sycamore, Ill. He was the author of a number of works of an ecclesiastical nature. Among them are *The Practice of the Interior Life*, *The Holy Priest* and *The Essence of Prayer*.

McLau'rin, ANSELM JOSEPH (1848-), an American lawyer and politician, born at Brandon, Miss. He received a common school education, entered the Confederate army in 1864, and at the close of the war completed a course in Summerville Institute. In 1868 he was admitted to the bar and began practice at Raleigh, where he was soon elected district attorney. He moved to Brandon in 1876, was elected to the state legislature, was a member of the constitutional convention of 1890 and four years later was chosen to the United States Senate to fill out an unexpired term. In the following year he was elected governor of Mississippi, serving until 1900, when he was again elected to the Senate.

McLean, *mak lane'*, JOHN (1785-1861), an American jurist and politician, born in New Jersey. He removed with his parents to Virginia, to Kentucky, and finally to Ohio, where he was admitted to the bar in 1807. He served in Congress from 1812 to 1816 as a Democrat, in the latter year being elected judge of the Ohio supreme court. He was postmaster-general under President James Monroe, also under John Adams, but refused reappointment under Jackson, owing to disagreement over the principle of partisan appointment and removal. He became associate justice of the United States Supreme Court in 1830. He was a candidate for the Free-Soil nomination to the presidency in 1848 and for the Republican nomination in 1856, and he wrote a dissenting opinion in the Dred Scott case.

MacMahon, *mak ma ohN'*, MARIA EDMIE PATRICE MAURICE DE, Duke of Magenta (1808-1893), a marshal of France, educated at the military college of Saint Cyr. He distinguished himself during the Crimean War and during the war with Austria in 1859, having much to do with the defeat of Austria at Magenta and Solferino. In the war between France and Germany in 1870, MacMahon was shut up in the town of Sedan by the German armies and was wounded in the battle before his surrender. After the war he assisted in putting down the Commune, and in 1873 he was elected president of the French Republic, a position which he occupied until 1879.

McMas'ter, JOHN BACH (1852-), an American historian, born in Brooklyn. He graduated from the College of the City of New York and soon became known as a writer on engineering subjects. He was instructor of civil engineering in Princeton; but, after six

years, resigned to devote his whole time to the study of history and was later elected professor of American history in the University of Pennsylvania. He published a number of books of history and biography, but his most important contribution to the science is a *History of the People of the United States*. This is a very extensive work, designed to cover the period from the Revolution to the Civil War, in seven volumes, five of which had appeared up to 1907.

McMil'lin, BENTON (1845-), an American politician, born in Monroe County, Ky. He received an academic education, was admitted to the bar and was elected to the Tennessee legislature in 1874. He was for twenty years (1879-1899) a member of Congress and at the close of his service was elected governor of Tennessee and was reelected in 1901.

McMonnies, *mak mun'iz*, FREDERICK (1863-), an American sculptor, born in Brooklyn. He studied at first under Saint Gaudens and in 1884 went to Paris. His first work, a statue of Diana, was exhibited in France in 1889 and was accorded honorable mention. His best known works are the *McMonnies Fountain*, at the World's Columbian Exposition in Chicago, in 1893; *Sir Harry Vane*, in the Boston Public Library, and *Shakespeare*, in the Congressional Library at Washington. After 1900 McMonnies devoted himself to painting.

Macomb, *ma koom'*, ILL., the county-seat of McDonough co., 65 mi. n. w. of Springfield, on the Chicago, Burlington & Quincy railroad. The city is in a productive agricultural region and has a considerable trade in farm produce, coal and lumber. Fire clay is found in abundance, and the manufacturing of clay products is the most important industry. The Western Illinois State Normal School is located here, and the city has a public library. Population in 1900, 5375.

Macomb, ALEXANDER (1782-1841), an American soldier, born in Detroit, Mich. He entered the cavalry service of the army in 1799 and had become adjutant general at the outbreak of the War of 1812. During this struggle he served with the artillery and by January, 1814, had become brigadier general, in command of the northern frontier. There, in September, he fought the Battle of Plattsburg, near Lake Champlain, simultaneously with McDonough's famous battle on the lake. For this service he was made major general and received the thanks of Congress, as well as a gold medal. From

1828 until his death he was commander in chief of the United States army.

Macon, *ma'kon*, GA., the county-seat of Bibb co., 100 mi. s. e. of Atlanta, on the Ocmulgee River and on the Central of Georgia, the Southern, the Georgia Southern & Florida and other railroads. It is the fourth inland cotton market in the country and ships large quantities of fruits, vegetables and other produce. The manufacture of cotton products is the most important industry. There are also railroad shops, lumber mills, kaolin mines, foundries and manufactures of clay products, furniture and other articles. The important educational institutions are Saint Stanislaus College, Mercer University, Mount de Sales Academy, the state academy for the blind and Wesleyan Female College, one of the oldest colleges for women in the United States. The place was settled in 1822 and was chartered as a city in 1832. Population in 1900, 23,272. Two adjoining suburbs have since been taken into the city, making the population at least 30,000.

McPherson, *mak fur' son*, JAMES BIRDSEY (1828-1864), an American soldier, born at Sandusky, Ohio. He graduated from West Point at the head of his class in 1853 and was appointed to the engineering corps. At the outbreak of the Civil War he entered the Federal service under General Halleck and was made lieutenant colonel. He took an active part in the expedition against Fort Donelson and Fort Henry and at the Battle of Shiloh, as chief of engineers on General Grant's staff. He was made major general of volunteers for services at Corinth, and he served with distinction in the Vicksburg campaign, being made brigadier general in the regular army. Later he became commander of the Army of the Tennessee and took a conspicuous and important part in Sherman's march to Atlanta. He lost his life in a gallant attack upon Atlanta in July, 1864.

Macready, *mak re'dy*, WILLIAM CHARLES (1793-1873), an English tragedian, born in London. In 1826 he made his first visit to America and in 1828 played in Paris, meeting with great success in both countries. He revisited the United States in 1843 and 1848, and during his last visit he was the victim of a riot in Astor Place, New York, stirred up by his rival, Edwin Forrest. For a time Macready held the management of the Covent Garden Theatre and later that of Drury Lane. He retired from the stage in 1851. Although lacking somewhat in fire and enthusiasm, Macready

was recognized as one of the great actors of his time.

Mac Veagh, *mak vay'*, WAYNE (1833-), an American lawyer and politician, born in Chester County, Pa. He graduated at Yale in 1853 and was admitted to the bar in 1856. After serving as prosecuting attorney, he took part in the defense of Pennsylvania during the Civil War, and in 1872 was appointed minister to Turkey. President Hayes placed him at the head of a commission to investigate conditions in Louisiana in 1877, and Garfield appointed him attorney-general in 1881. He supported Cleveland for president in 1892 and was appointed minister to Italy in the following year. In 1903 Mac Veagh was chief counsel for the United States in the Venezuela controversy before the Hague tribunal.

Mad'agas'car, a large island in the Indian Ocean, 230 mi. from the east coast of Africa, from which it is separated by Mozambique Channel. Its length is about 980 miles, its greatest breadth, 358 miles, and its area, including a few islets, 228,500 square miles. Madagascar may be described as an elevated region, with an average height of from 3000 to 5000 feet, overlooked by mountains rising in some cases to nearly 9000 feet. The coast exhibits a number of indentations, with several very fine natural harbors in the northwest. The rivers are numerous, yet few of them offer even to a moderate extent the advantages of internal navigation. The climate is oppressively hot on the coast, but it is temperate on the highlands of the interior, and the island is unhealthful for Europeans only in the neighborhood of lagoons or marshes. The rainy season continues from December to April.

The trees of Madagascar include palms, ebony, mahogany, fig, cocoanut and the ravinala, or traveler's tree, which when pierced yields a refreshing juice. The vegetable products grown for food include rice, manioc, or cassava, sweet potatoes, ground nuts and yams. Ginger, pepper and indigo grow wild; cotton, sugar cane, coffee, tobacco and hemp are cultivated. India rubber, gum copal and dyewoods are exported. Humped cattle are found in immense herds, and form a large part of the wealth of the inhabitants. There are also sheep, goats, swine and horses. The most characteristic of the wild animals are the lemurs (See LEMUR). Birds are numerous; snakes are rare; crocodiles, lizards and chameleons abound.

The inhabitants, called Malagasy, belong to

Madagascar

the Malayo-Polynesian stock and speak a Malayan language. The Hovas are the ruling tribe, having extended their sway over nearly the whole island, while the other chief tribes are the Betsimisarakas, the Betsileos and the Sakalavas. In the coast districts the houses of the better class are built of framed timber and have lofty roofs; the dwellings of the lower classes are constructed of bamboo or rushes, or even of clay. The Malagasy show much aptitude as silversmiths, gunsmiths and carpenters, and with rude looms they make handsome cloths. The religion of the great bulk of the people is a kind of fetishism, or worship of charms. Many of their superstitious customs have been abolished, and Christianity has been adopted, chiefly by the Hovas, but polygamy and infanticide are still practiced. The government is an absolute monarchy, but it is subject to France. The capital is Antananarivo (See ANTANANARIVO).

Madagascar was known to Marco Polo at the end of the thirteenth century, and in 1506 it was visited by the Portuguese, who gave it the name of Saint Lorenzo. In the latter part of the seventeenth century and during the most of the eighteenth century, the French had the ascendancy in the island, but the English gained the supreme influence early in the nineteenth century. In the year 1810 Radama I became king of the Hovas, and with his approval Christian missionaries began to teach in the capital in 1820. Many converts were made, the Bible was translated into the Malagasy tongue, the language was reduced to a systematic written form and printing was introduced. In 1828 Radama was succeeded by his chief wife, Ranavalona I, a woman of cruel disposition, who persecuted the Christians and closed the island to Europeans. She was succeeded in 1861 by her son, Radama II, who reopened it to the missionaries and emancipated the African slaves. He also granted extensive territories and privileges to France, an act which offended his chiefs and led to his assassination in 1863. His wife occupied the throne five years, and she was succeeded by Ranavalona II, who became queen in 1868. Under her, Christianity became the State religion. The government, jealous of foreign influence in the island, invaded French territory in 1883, and the result was a struggle which lasted for two years. By a treaty in 1885, Madagascar was virtually placed under French protection, and eleven years later it was declared a colony of France. In 1897, France emanci-

Madeira

pated the slaves of the Hovas and in the same year was obliged to put down a serious rebellion.

Mad'der, a genus of plants native in almost all tropical regions. From the roots of a species which is grown extensively in Holland is obtained a beautiful red coloring matter, which in one shade is known as *turkey red*. The chief coloring matter in the different madder dyes is called alizarin. *Common madder* is a native of



MADDER

southern Europe and Asia, though cultivated in most European countries. It has black fruit and small, greenish-yellow flowers. A French variety, grown in the neighborhood of Avignon, is considered the best. Cinchona trees and coffee trees are members of this family, and in the United States the common bluets and button-bush are representatives. The madder family has about 4500 species. See DYEING.

Madeira, *ma de'rah*, a Portuguese island in the North Atlantic, about 400 mi. from the coast of Morocco. Its length is about 38 miles, its breadth, 12 miles, and its area, 315 square miles. The island is traversed by a central mountain ridge, the highest point of which is over 6000 feet. The chief product of Madeira is wine, for which it has long been famous, and of which it exports yearly about 700,000 gallons. The climate is equable, and the island is considered an excellent health resort. The capital and chief center of trade is Funchal. Madeira

Madeira River

was colonized by the Portuguese in the early half of the fifteenth century. Population in 1900, 150,574.

Madeira River, a large river of South America, the largest tributary of the Amazon. It is formed by the union of the Beni, the Mamoré and the Guapore, on the frontiers of Brazil and Bolivia. With the Mamoré its length is about 2000 miles, and it is navigable for almost half of this distance. East of the Bolivian frontier the navigation is interrupted by cataracts, but beyond the cataracts it is again navigable.

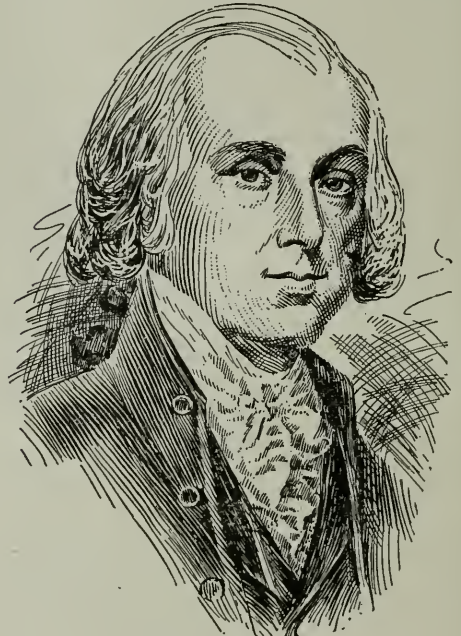
Madison, IND., the county-seat of Jefferson co., 50 mi. n. e. of Louisville, Ky., on the Ohio River and on the Pittsburg, Cincinnati, Chicago & Saint Louis railroad. The city has a large river trade and contains shipbuilding and lumber yards, foundries, machine shops, tanneries and cotton and woolen mills. It has public and parish schools and Saint Gabriel's Academy. Madison was first incorporated in 1824. Population in 1900, 7835.

Madison, Wis., the capital of the state and county-seat of Dane co., is situated 83 mi. w. of Milwaukee on the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul and the Illinois Central railroads. It is situated in the center of a broad valley and is almost surrounded by four very attractive lakes. Beautiful boulevard driveways radiate from the city in all directions. Among the chief buildings is the new state capitol, now being built at a cost of \$5,000,000, on the site of the old one, which was burned in 1904. The library and museum building of the Wisconsin Historical Society is of special interest. It is situated opposite the state university campus and cost \$700,000. It houses the state historical and state university libraries, in all numbering 240,000 volumes. In addition to this library there are state law libraries and a Carnegie library, which was merged with the public library. The chief educational institution is the University of Wisconsin, founded in 1849 (See WISCONSIN, UNIVERSITY OF). Madison is the home of two learned societies, the Wisconsin Academy of Sciences, Arts and Letters and the Wisconsin Geological and Natural History Survey. A state asylum for the insane is situated on Lake Mendota, near the city. The manufactures include agricultural implements, machinery, tools, flour, boots and shoes and electrical appliances. There are also numerous printing establishments. In 1836 the city of Madison

Madison

was chosen for the location of the state capital, and since 1839 it has been the regular seat of government. It was chartered as a city in 1856. Population in 1905, 24,301.

Madison, JAMES (1751-1836), an American statesman, fourth president of the United States. He was born at Port Conway, Va., and was educated at Princeton College, at first with the intent of entering the ministry, later in preparation for a legal career. He served in minor



JAMES MADISON

local public offices until 1776, when he was a member of the Virginia constitutional convention. There he vigorously advocated the granting of absolute religious freedom and thus displayed for the first time his natural democratic inclinations. He became a member of the first state assembly, but was defeated at the end of the term by corrupt means. In 1780 he was sent by the state to the Continental Congress.

Returning to his state in 1784, he again was elected to the legislature, where he labored diligently toward the upbuilding of a strong union of the colonies, in order to secure for all the necessary stability and prestige. In the constitutional convention of 1787 he was a leading figure, though, being secretary of the convention, he did not take a conspicuous place in the debate. On account of his service, he was afterward called the "Father of the Constitution." As a contributor to the *Federalist*, with

John Jay and Alexander Hamilton, he did much to secure the ratification of the Constitution by the states, especially New York and Virginia. In 1789 he was elected to the national House of Representatives, where he remained eight years. Though elected as a Federalist, he soon found himself in opposition to Hamilton, and he eventually became a leader of the Anti-Federalist, later Republican, and still later, Democratic, party.

After his retirement from Congress, Madison for a time did not show active interest in political affairs, though it is believed that the Virginia Resolutions of 1798 (See KENTUCKY AND VIRGINIA RESOLUTIONS) were written by him. When Jefferson became president in 1801, he chose as his secretary of state, Madison, who was his warm personal friend. Madison retained the office for eight years, until he himself was elected president. Though not displaying remarkable powers as a diplomat or an executive, Madison's term at the head of the state department showed him to be a man of firm convictions and perfect integrity.

When he became president in 1809, the foreign affairs were in a serious state, and throughout his first term he was confronted by some of the most serious diplomatic problems in the history of the country. He was unsuccessful in attempting to apply his theory that foreign nations can be brought to terms by depriving them of American trade. When the war was forced upon him, he devoted himself to its prosecution, but proved not to be an efficient executive. However, he was reelected in 1813, his second term being filled with controversies over internal taxation, the establishment of the United States Bank, which was finally carried in 1816, and the tariff, in which a protective principle was incorporated for the first time in the same year.

At the close of his term, Madison retired to his estate at Montpelier, Va., where, though living quietly, he maintained a strong influence upon his party and upon political events in general. His wife, Mrs. Dorothy Paine Todd Madison, was perhaps the most popular mistress that the White House has ever known, being familiarly called "Dolly" Madison. See Gay's *James Madison* in American Statesmen Series.

Madon'na, a term now commonly used in all languages to refer to the Virgin in works of art. It was not until after 431 A. D., when the Council of Ephesus declared the Virgin Mary to be

the Mother of God, that she was frequently represented in art, but after that time the number of paintings increased rapidly. In early art she was painted with a robe of blue, starred or marked with gold and usually draped over her head. Byzantine models were followed up to the thirteenth century, when the revival of painting in Italy brought more natural and beautiful forms. Fra Filippo Lippi was the first to portray the incarnation of maternal love and childish innocence. Botticelli's two best productions represent the Virgin crowned and adored by dreamy angels. Only two of Leonardo da Vinci's Madonnas remain, both of which are charming representations. The Umbrian painters left striking and beautiful pictures of the Madonna, one of the best of which is the *Madonna Enthroned*, by Dosso Dossi, now in the Cathedral at Ferrara. Of Venetian painters, Giovanni Bellini and Titian stand out most prominently, and Titian's *Pesaro Madonna* in the Church of Frari, Venice, is the most celebrated. Of all the Italian painters of Madonnas, Raphael was the greatest. In his early period his theme was Mary the mother, while later he represented her as queen of heaven. Of his fifty or more excellent Madonnas, the most celebrated are the *Madonna of the Chair* and the *Sistine Madonna* (See below).

The artists of northern Europe did not produce many famous Madonnas, and of these, few remain. The first in rank of the German Madonnas is the *Madonna of Burgomaster Meyer*, at Darmstadt, the work of Holbein. Rubens and Van Dyke also furnished excellent examples. Murillo is the representative Spanish painter, and his best works are to be seen in the Pitti Gallery, Florence, in the Corsini Palace in Rome and in the Louvre, Paris.

A few of the famous Madonnas now in the galleries are the following:

Madonna di Ansidaï, by Raphael (1506), the finest in England, in the National Gallery, London. Sometimes it is called the *Blenheim Madonna*, because it was purchased there in 1844 for \$350,000.

Madonna del Baldacchino (Madonna of the Canopy), by Raphael (1508), in the Pitti Palace, Florence. The Virgin, enthroned under a canopy, the curtains of which are raised by angels, sits with Jesus in her lap.

Belle Jardiniere (Pretty Gardener), by Raphael (1507), in the Louvre. The Virgin, seated in a meadow among flowers, is looking at the infant

Jesus, who stands at one knee; at the other, Saint John kneels, holding a cross.

Madonna de Candelabri or *Madonna de la Candelabras*, by Raphael (1516-1517), in London. On one side of the Virgin, who holds the infant Jesus, is a burning torch held by an angel. Because this was formerly in the Borghesi Palace it is sometimes called the *Borghesi Madonna*.

Madonna of the Basket, by Correggio (1520), in the National Gallery, London.

The *Sistine Madonna*, by Raphael (1518), now in the Dresden Gallery, Germany. It represents the Virgin supported on clouds and carrying the child Jesus in her arms. On one side Pope Sixtus II kneels in supplication. At the other side kneels Saint Catherine, and below, the two famous cherubs of Raphael are leaning. This picture was painted as an altar piece for the Church of San Sisto at Piacenza, and it was finished just before Raphael's death (See RAPHAEL).

Madonna of the Rocks, by Leonardo da Vinci, in the National Gallery, London. It takes its name from the appearance in the background of a grotto, with high rocks. The Virgin is presenting the infant John to Jesus, who, supported by an angel, is blessing him.

Madonna of the Rosary, by Domenichino, in the Bologna Gallery. Other paintings of the same name have been done by Murillo, Caravaggio and Van Dyke.

Madonna of the Chair (*Madonna della Sedia*), by Raphael (1516-1517), in the Pitti Palace, Florence. The Virgin is seated in a chair, clasping Jesus in her arms, while Saint John is depicted in adoration at the left.

Madras', a maritime city of British India, capital of the province of the same name, on the Coromandel coast. It is ill-situated for commerce, standing on an open surf-broken shore, with no proper harbor, though an area has been enclosed by piers so as to shelter a certain amount of shipping. Despite drawbacks, however, Madras carries on an extensive commerce, being the terminus of railways from Bombay and the south, while it is also the headquarters of all the province departments. There are no manufactures worthy of mention, but the export and import trade amounts to millions of dollars annually. Madras was founded in 1639 by the English, and it soon became their chief settlement on the coast. It was taken by the French in 1746, but three years later it was restored to the English. Population in 1901, 509,397; about one-tenth are Christians.

Madras, a province of British India. With its dependencies, it comprises the extreme southern part of the peninsula of India. Its area, not including the native states, is 141,726 square miles. It is surrounded by the sea on every side except the north, on which side it is bounded by Orissa, the Central Provinces, the territory of Hyderabad and Mysore. The chief rivers are the Godavery, the Kistna and the Kavery. The climate of Madras is varied. The soil is sandy along the coast, but there are many fertile districts; iron, copper, lead and coal are found in considerable quantities. There are extensive forests in the province, yielding teak, ebony and other valuable timber trees. The principal vegetable products are grains, sugar cane, yams, plantains, tamarinds, mangoes, melons, cocoanuts, ginger, tobacco, oil, seeds, coffee and cotton. The most common wild animals are the elephant, the tiger, the jackal, the wild hog and the ibex. The population in 1901 was 38,209,436, and the native protected states have in addition a population of 4,188,088.

Madrid', the capital of Spain, in New Castile, in the Province of Madrid, on the Manzanares, near the center of the Iberian Peninsula. Situated upon a high plateau, 2150 feet above the sea, wind-swept from the snowy Guadarrama, with unhealthy extremes of temperature, the city has no advantages except the fanciful geographical merit of being in the center of Spain. The principal streets are broad, long and airy, but the squares are generally irregularly built and deficient in decorative monuments. The royal palace, a combination of Ionic and Doric architecture, is one of the most magnificent palaces in the world. It contains a small but splendid Corinthian chapel, a library of nearly 100,000 volumes and a fine collection of ancient armor and coins. The bull fights take place in the Plaza de Toros (bull ring), a building which is about 1100 feet in circumference and which is capable of seating 13,000 spectators. The Prado, a boulevard on the east of the city, is one of the finest promenades in Europe, and beyond it is the park. The Royal Museum of Painting and Sculpture, in the Prado, contains more than 2000 pictures, many of them by the greatest masters of painting, especially those of Spain. The National Library, founded by Philip V, contains over 600,000 volumes. The university has an average attendance of 5000 students, and there are numerous colleges and medical, military and

Madura

law schools. The manufactures are of small value, although there is a large tobacco factory. Madrid began to be a place of importance under Charles V, and in 1561 Philip II made it the capital. Population in 1900, 539,585.

Madura, *ma doo'ra*, an island of the Indian Archipelago, n. e. of Java, from which it is separated by the Strait of Madura. Its area is about 1700 square miles. It is not very fertile, but maize, cocoanuts, tobacco, Jamaica pepper and tamarinds are produced to some extent. The chief industry is cattle raising. The inhabitants, mostly Mohammedans, are governed by native princes. Population, 1,630,510.

Maelstrom, *male'strom*, or **Malström**, the name of a tidal current or whirlpool off the northwestern coast of Norway, immediately southwest of the most southerly of the Lofoten Islands. The current is caused by the ebb and flow of the tides through the channel, producing an immense whirling motion. Formerly the water was supposed to be of such depth that it could not be sounded, but later explorations show that the depth does not exceed 20 fathoms. This whirlpool has been the subject of numerous legends by both medieval and later writers. When the wind is northwest it is at its worst at either high or low water, and under these circumstances it cannot be passed over with safety, but at other times boats traverse it without difficulty. See WHIRLPOOL.

Maeterlinck, *net'ur link*, MAURICE (1862-), a Belgian poet, born in Ghent. His dramas, on which his fame largely rests, include *Monna Vanna*, perhaps his greatest work; *The Princess Maleine*, *The Blind*, *The Intruder* and *Home*. These plays, mystical and symbolic, are, with the exception of *Monna Vanna*, not well adapted for presentation on the stage. His characters are not living human beings, but simply figures which the poet uses to express his morbid views on life and death. Another kind of work in which he has been exceedingly successful is essay writing. *The Treasure of the Humble*, *Wisdom and Destiny*, *Our Friend the Dog* and *The Life of the Bees* are studies charming in subject as in presentation.

Mafia, *mah'fe ah*, a Sicilian secret society, whose object is to protect its members from punishment for any crimes they may commit. Nothing is known definitely of its origin or its organization, and it is believed that there is not a very strict, systematic organization. The members take oath to obey their leader in all things, to keep the secrets of the order, never to

Madgeburg

go to law for any grievance and to help their fellow members under all circumstances. Branches of the Mafia exist in various cities of the United States. When in 1890 the chief of police in New Orleans was murdered, the crime was laid to the Mafia, eleven of whom were put in jail. The jail was broken into, and the prisoners were murdered by a mob, and the affair came near leading to complications with the Italian government.

Magazine, *mag a zeen'*, a protected room, used for the storage of ammunition. On land the magazines are usually underground or have shell-proof defenses. The magazines of war ships are placed below the water line, as far as possible away from the engines and near to the guns. They are so constructed that they may be flooded in case of accident and are kept cool by currents of air and water. The light all comes from above, through glass windows. Iron fittings are not used anywhere in the magazines, and the ammunition handlers do not wear metal on their clothing or shoes. The opening to the magazine proper is small and is communicated with by a handling room, into which the ammunition is passed in small quantities and from which it is taken with cars and tackle to the guns.

Mag'dalen or **Magdalene**, MARY, that is, Mary of Magdala. She is mentioned in the New Testament as having had seven devils cast out of her, as watching the crucifixion and as having come early to the sepulcher on the resurrection morning. She was erroneously identified as the "woman who was a sinner" (Luke VII, 37), and hence the term Magdalen came to mean a penitent fallen woman.

Mag'dale'na, a river of South America, which rises at the frontier of Equador, flows generally north through Colombia, and empties into the Caribbean Sea by several mouths. Its length is about 950 miles, and it is navigable as far as Honda, about 600 miles.

Mag'dalen Islands, a group of islands in the Gulf of Saint Lawrence, 54 mi. n. w. of Cape Breton Island. The inhabitants, about 5000 in number, depend for their support chiefly upon the fisheries. Lobster, cod, herring and seal are taken in great numbers.

Magdeburg, *mahg'de boorK*, the capital of Prussian Saxony, a fortress of the first class, on the Elbe, 76 mi. w. s. w. of Berlin. The city is chiefly on the left bank of the river, which here divides into three arms. The fortifications

comprise the citadel and a number of detached forts and redoubts. Among the chief buildings are the Cathedral of Saints Maurice and Catharine, the churches of Our Lady, Saint Ulrich and Saint Paul, the Synagogue, the Rathaus and the old royal palace. The manufactures are varied, embracing machinery, castings, armor plates, chemicals, spirits, pottery, sugar, beer, cottons, ribbons, leather and tobacco. Of the beet sugar industry Magdeburg is the chief center in Germany. The trade is extensive, both by rail and river. Magdeburg was first prominent in the tenth century, when it became the seat of an archbishop. It early distinguished itself in the Reformation. During the Thirty Years' War the town was besieged, stormed and sacked by Tilly, and 20,000 persons are said to have been murdered. Population in 1900, 229,663.

Magellan, *ma jél'an*, or **Magalhães**, FERDINAND (about 1470-1521), a Portuguese navigator, who conducted the first expedition around the world. He served in the Portuguese army in the Indies for a time, but was not well rewarded and offered his services to Spain. In 1519 he received the command of a fleet of five ships, with which he sailed westward, entered the straits since called by his name and discovered the Pacific Ocean. Subsequently he was killed in a skirmish with the natives on one of the Philippines, but one of his vessels completed the journey to Spain.

Magellan, STRAIT OF, the strait which separates the continent of South America from the islands of Tierra del Fuego. It is over 350 miles long and varies in breadth from 2 to 70 miles; it forms communication between the South Atlantic and South Pacific oceans. The number of obstructing islands makes the channel difficult of navigation. The strait was discovered in 1520 by Magellan, for whom it was named.

Magenta, *ma jen'ta*, BATTLE OF, a famous battle which took place on June 4, 1859, between the French and Sardinians, under Napoleon III and Victor Emmanuel, and the Austrians. The victory, which was with the allies, was due largely to the bravery and brilliant tactics of Marshal MacMahon.

Maggiore, *ma jo'ray*, LAKE, or **Lago Maggiore**, a lake partly in northern Italy, partly in Switzerland, 37 miles in length and averaging 2 miles in breadth. It is 635 feet above the level of the sea and is in some places considerably over 1000 feet deep. Its banks

are highly picturesque, and it is surrounded on all sides by hills.

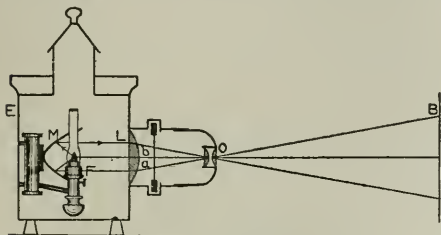
Magi, *ma'ji*, the hereditary priests among the Medes and Persians, set apart to manage the sacred rites and to preserve and propagate the sacred traditions, acting also as diviners and astrologers. They possessed great influence, both in public and private affairs, conducted the education of the princes and were constant companions of the monarchs. Their order was reformed by Zoroaster, who compelled them to live the severe and simple lives that the law had laid down for them. The name *magi* came also to be applied to holy men or sages in the East. The wise men that came from the East to worship Jesus were magi, whose names given by tradition were Melchior, Balthasar and Gaspar. It is claimed their bones are in the Cathedral of Cologne. One of the men in works of art is represented as a black man. See EPIPHANY.

Magic, *ma'j'ik*, the art or pretended art or practice of producing wonderful effects by the aid of superhuman beings or of departed spirits or the hidden powers of nature. A large proportion of magical rites are connected with the religious beliefs of those using them, their efficiency being ascribed to supernatural beings. There is, however, an element in magic which depends on certain imagined powers and natural powers, that can be utilized in various ways. In savage countries the native magician is often sorcerer and priest, and sometimes chief of the tribe. Among the ancient Egyptians magic was worked into an elaborate system and ritual, and it was regularly practiced among the Babylonians and Assyrians, as well as in Greece and Rome. Alexandria, from the second to the fourth century, became the headquarters of a system of magic, in which invocations, sacrifices, diagrams and talismans were systematically employed. The term is also, though wrongly, applied to the operations of sleight-of-hand performers.

Magic Lantern or **Stereop'ticon**, an instrument used for projecting upon a screen a highly magnified image of a transparent picture or some other object. The important parts of the magic lantern are (1) the box, *E*, which may be of wood or metal, but must be light-tight and must contain a chimney and openings for the admission of the air; (2) the light, *F*, back of which in some lanterns there is a concave mirror, *M*; (3) the condenser, *L*; (4) the slide or picture to be magnified, *a b*; (5) the magnifying glass or objective, *O*. The condenser collects

Magic Square

the rays of light from the lamp and concentrates them upon the slide. As they pass through the object glass they are caused to expand and produce an enlarged image of the picture upon the screen, *B*. Since the rays cross in the object glass, the image is inverted, and in order to have it appear erect the slide must be placed in



MAGIC LANTERN

the lantern in an inverted position. The light employed in the best instruments is the calcium, or lime, light, or the electric light. The magic lantern is extensively used as an educational appliance, in teaching geography and history in elementary schools and for scientific purposes in high schools and colleges.

Magic Square, a continuous series of numbers, arranged in a square, in such a manner that the sum of the figures in each column or row is equal to that in each of the others. The following is a simple magic square. In this case the sum is 34.

1	14	15	4
12	7	6	9
8	11	10	5
13	2	3	16

Magna Charta, *mag'na kahr'tah*, or **Great Charter**, a document forming part of the English Constitution and regarded as the foundation of English liberty. It was extorted from King John by the confederated barons in 1215. Its most important articles are those which provide that no freeman shall be taken or imprisoned or proceeded against except by the lawful judgment of his peers or by the law of the land; and that no scutage or aid shall be imposed in the kingdom (except certain feudal dues from tenants of the crown), except by the common council of the kingdom. The remaining and greater part of the charter is directed against abuses of the king's power as feudal superior. The charter was confirmed several

Magnetic Needle

times during the reigns that succeeded John's and the form adopted in the reign of Edward I was set down in the statute books. The most accurate and complete copy of the original charter is that preserved in Lincoln Cathedral. The board of commissioners on the public records ordered a facsimile of it to be engraved, and it has been frequently translated into English.

Magnesia, *mag ne'zhe ah*, the oxide of magnesium, a white, tasteless, earthy substance, of an alkaline nature. It is almost insoluble, is absorbent and is a mild cathartic remedy. In commerce, pure magnesia is generally distinguished by the term calcine of magnesia, and it is readily obtained by exposing *magnesia alba* to a red heat.

Magnesian Limestone. See DOLOMITE.

Magnesium, *mag ne'zhe um*, a silvery-white metal, with a brilliant luster. It is very malleable and fuses at a red heat. Although magnesium is not found separate in a state of nature, it is one of the widely distributed elements in such mineral compounds as chrysolite, dolomite, hornblende, serpentine, soapstone, tourmaline and meerschaum. Heated to redness in oxygen gas, it burns with brilliancy, and combining with the oxygen, it becomes magnesia, or the oxide of magnesium. A magnesium light is rich in chemical rays and is now employed to some extent in photography. The chief salts are the carbonate, the chloride, the sulphate (See EPSOM SALTS), the phosphates and the silicates.

Mag'net, a substance which has the power of attracting iron, steel, nickel and cobalt. Magnets are natural or artificial. *Natural* magnets are pieces of iron ore called magnetite and have strong magnetic properties. They are also known as loadstones or lodestones. *Artificial* magnets are those made by magnetizing iron or steel. The force of a magnet is strongest at the ends, which are called the *poles*. The horseshoe magnet is U-shaped. A piece of soft iron placed across the ends and held in place by the force of magnetism, is called the armature. A bar magnet is straight. An electro-magnet is one made by an electric current. For an understanding of the properties and uses of magnets, see MAGNETISM.

Magnet'ic Needle, a small bar magnet, suspended so as to move freely in a horizontal direction. The needle points nearly due north and south. The north end is called the north pole, and the south end, the south pole. See COMPASS; MAGNETISM.

Mag'netism, the power possessed by a magnet, by means of which it attracts iron and steel. Magnetism was known for centuries before it was applied to any practical use. It was first discovered in a variety of iron ore found near Magnesia, in Asia Minor; hence, the name *magnet*. This ore, commonly known as magnetic iron or magnetic iron ore, is found in many parts of the world, but it occurs in large quantities in the Scandinavian peninsula and in Siberia. However, only very small portions of it possess the power of magnetism to any extent. These pieces are commonly known as *loadstones*. A piece of loadstone forms a *natural* magnet, while a piece of iron or steel which has been magnetized forms an *artificial* magnet.

A magnet can be made by taking a piece of iron or steel and rubbing it with a loadstone or an artificial magnet. Magnetism is imparted to soft iron quickly, but when the magnet is removed the force disappears. It requires considerable time to magnetize hard steel, but when magnetized it retains its magnetism for a long time. The magnetic force is manifested at the ends of the magnet, which are called *poles*. This is illustrated by placing a bar of magnetized steel in a box of iron filings. The filings will adhere to each end, but will not adhere to the middle of the bar. When a bar magnet is suspended in a horizontal position so that it can move freely, it always points nearly north and south. For this reason the end pointing to the north is called the north (+) pole, and the end pointing south, the south (—) pole. The magnetism of the two poles is different, and when poles of the same name are brought together they repel each other, while those of different names attract each other. If the north poles of two bar magnets approach each other and the magnets are free to move upon a point of suspension, they will turn in opposite directions. The *magnetic needle* is a small bar magnet suspended horizontally upon a point; it is always found in the compass. The space over which a magnet exerts influence is called the *magnetic field*. If a piece of soft iron, as a tack or a staple, is brought within this space, it becomes magnetized by induction, but loses its magnetism as soon as it is removed from the field. All magnets lose their power if left without protection. For this reason, a piece of soft iron, called the *armature*, should be placed across the end of a horseshoe or U-shaped magnet when it is not in use, and bar magnets should be laid

side by side so that the north pole of one will be next the south pole of the other, and armatures should then be placed across each end.

The exact nature of magnetism is still a subject of investigation and discussion. Ampere's theory of the practical identity of electricity and magnetism is now very generally discredited. No other has yet taken its place in good standing. See ARMATURE; ELECTRO-MAGNETISM.

Mag'netite or **Magnetic Iron Ore**, an ore of iron, containing a large proportion of oxygen and exhibiting magnetic properties. It is of an iron-black color, has a metallic luster and is very hard. Magnetite is one of the most valuable of iron ores, since its addition to other ores greatly improves the quality of the iron produced. It occurs in massive form and in sand. The largest quantities are produced in Sweden. When occurring in sand, it can often be obtained in paying quantities by washing the sand in sluices, across the bottom of which small bars of wood are placed at frequent intervals. The magnetite is heavier than the sand and sinks to the bottom. After the water is shut off it can easily be collected.

Mag'neto-Elec'tric Machine, a machine for generating electricity by magnetism. In the ordinary machine an electro-magnet, called the armature, is caused to rotate near the poles of a powerful fixed magnet, in such a manner that the core of the armature becomes magnetized first in one direction and then in the opposite, by the inductive action of the poles of the fixed magnet. Every change in the magnetization of the core induces a current in the coil wound upon it. Hence currents in alternately opposite directions are excited in this coil, their strength increasing with the speed of rotation. It is now usual in powerful machines of this class to employ electro-magnets as the fixed magnets, and the current which feeds these fixed magnets is often the current generated by the machine itself. The machines in this case are called dynamo machines. This name was originally confined to machines which thus supply the current for their own field magnets; but it is now applied to any machine in which the field magnets are electro-magnets. Such machines, of which there is an enormous variety, driven by steam engines or other powerful motors, are now almost universally employed when electric currents are required on a large scale, as in electric lighting. See DYNAMO; ELECTRO-MAGNETISM.

Magnificat, the song of the Virgin Mary, *Luke* 1, 46-55, so called because it commences

Magnolia

with this word in the Latin *Vulgate*. It is sung throughout the Western Church at vespers, or evensong.

Magnolia, a genus of trees and shrubs, remarkable for their rich green foliage and large, beautiful flowers. There are more than a dozen species, most of which are natives of subtropical Asia and North America, but they have been long cultivated extensively in the warmer parts of Europe. The *great-flowered magnolia* is the



MAGNOLIA

most beautiful of several species that are native to the Southern states. This is a tree of great size and perfect shape, with large, evergreen leaves, splendid, fragrant, white flowers and scarlet cones. These cones, which are the fruit of the plant, open when they are ripe, and the bright red seeds hang suspended from fine threads like cobwebs. The *cucumber tree*, the *melon tree*, the *mountain magnolia* and the *sweet bay*, the *white laurel* and *swamp sassafras* are other native species. See **TULIP TREE**.

Mag'pie, a bird of the crow family. There are several species, two of which belong to



MAGPIE

America and are found from the Arctic regions to California. The American magpie is a handsome black and white bird and a determined robber of other birds' nests. The European magpie is a fine, black bird, with white patches on its belly and shoulders. It is celebrated for its crafty instincts, its power of imitating words,

Mahanadi

its continuous chatter and its habit of stealing every glittering article it sees.

Magru'der, JOHN BANKHEAD (1810-1871), an American soldier, born in Virginia. He graduated at West Point in 1830, took an active part in the Mexican War and when the Civil War broke out joined the Confederate army, with the rank of brigadier general. Later in the same year he was made major general. He did good service throughout the war, and at its close he served in the imperial army in Mexico until the overthrow of Maximilian.

Mahabharata, *ma hah'b'hah'rah tah*, (literally, "the great history of the descendants of Bharata"), an ancient Indian epic of about 220,000 lines, divided into eight books, the leading story of which narrates the history of the war between the Kauravas and the Pandavas for the possession of the ancient kingdom of Bharata, which is said to have comprised the greater part of India. The Pandavas, who are represented as incarnations of heroism and goodness, are finally victorious. The authorship of the epic is attributed to Vyâsa, "the arranger," but this simply means that the materials of which the poem consists were at some time or other welded together with a certain order and sequence so as to form one work.

Mahan', ALFRED THAYER (1840-), an American naval officer and author, born at West Point, N. Y. He graduated from the United States Naval Academy and at once entered the navy, serving until he was retired in 1896 at his own request. For several years he was president of the Naval War College at Newport; he was a member of the naval board of strategy during the war with Spain, and the next year he was one of the American representatives to the peace conference at The Hague. He has written a number of historical works, of which the most important are his *Influence of Sea Power upon History, 1660-1783*, and his *Life of Nelson*. As a historian he has made a distinct contribution to the science by pointing out how maritime strength is one of the determining factors in the development and prosperity of a nation.

Mahanadi, *mah hah nah'de*, or **Mahanuddy**, a river in southern Hindustan, which flows through the Central Provinces and Orissa, falling by several mouths into the Bay of Bengal. Its total length is 520 miles, and it has several large tributaries. Together with the canal system which has been constructed in connection with it, it irrigates hundreds of thousands of acres.

Mahanoy, *mah ha noi'*, **City**, PA., a borough in Schuylkill co., 55 mi. n. e. of Harrisburg, on the Mahanoy Creek and on the Philadelphia & Reading and the Lehigh Valley railroads. It is in the anthracite coal region, near deposits of fire clay and building stone, and it contains foundries, potteries, and flour, lumber and hosiery mills. The borough has a public library, a number of churches and both public and parish schools. It was settled in 1859 and was incorporated in 1863. Population in 1900, 13,504.

Mahdi, *mah'de*, (director or leader), a name assumed by some of the successors of Mohammed, particularly applied to the twelfth imam, the lineal descendant of Mohammed, born 868 A. D. He mysteriously disappeared, being murdered, probably, by a rival, and the belief was that he would remain hidden until the "last days," when he would reappear and at the head of the faithful spread Mohammedanism over the world. Many professed Mahdis have appeared from time to time in Africa as well as Asia, the latest being Mohammed Ahmed, the leader of the Sudanese insurrection (1883-1885). He made the chief city of Kordofan his capital and annihilated the Egyptian army, Nov. 5, 1883. His influence extended to the Red Sea. The Mahdi died in 1885. See GORDON, CHARLES GEORGE.

Mahmud II, *mah mood'*, (1785-1839), sultan of Turkey, placed on the throne after the deposition of his brother in 1808. The chief events of his reign were the war with Russia from 1808 to 1812, which cost him Bessarabia and the provinces of Servia, Moldavia and Wallachia; the war of Greek independence, which ended in the separation of Greece from Turkey and included the destruction of the Turkish fleet at Navarino; the extermination of the Janizaries and the reorganization of the army on a European model; the Treaty of Adrianople with the Russians, who were on the point of entering Constantinople in 1829; the revolt of Egypt under Mehemet Ali, and the new Treaty of Unkiar-Skelessi with the Russians in 1833.

Mahog'any, the wood of a lofty and beautiful tree, native to Central America and the West Indies. It grows most abundantly and attains its greatest development between 10° north latitude and the Tropic of Cancer. It reaches maturity in about two hundred years and grows to a height of forty to fifty feet, with a diameter of six to twelve feet. The wood is hard, compact, reddish brown and takes a brilliant polish.

It is one of the best and most ornamental woods known and is of universal use in the making of fine furniture. It is imported to the United States chiefly from Mexico and British Honduras. British Honduras exports an average of 3,000,000 cubic feet per year. That which is imported from the West Indies is called Spanish mahogany and is most valued.

Mahom'et. See MOHAMMED.

Mahrattas, *ma rat'taz*, a people inhabiting the western part of the peninsula of India and numbering from 15,000,000 to 20,000,000. They are of mixed blood, speak the Hindu language and are followers of the Hindu faith. In the latter part of the seventeenth century they rose rapidly and were instrumental in depriving the Mogul Empire of much of its power. In the latter part of the eighteenth century they were overpowered by the Afghans and later became subject to the British government. The present cities under British rulers are Baroda, Gwalior and Indore.

Maid'enhair, the name given to elegant ferns, of which there are many widely distributed



MAIDENHAIR FERN.

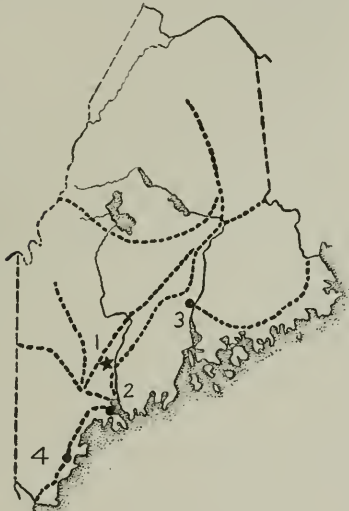
species. The common maidenhair of the United States bears a cluster of upright, brown, shiny, wiry stalks, upon the top of which the graceful fronds expand horizontally. In some cultivated species these fronds are exceedingly delicate,

and in all, the rounded, scalloped leaflets are characteristic.

Maid of Orleans. See JOAN OF ARC.

Main, mine, a river of Germany, which rises in the Fichtelgebirge, flows in a general westerly direction for 300 miles and joins the Rhine a little above the town of Mainz. For about 200 miles from its mouth it is navigable. By means of the Ludwig Canal it affords through navigation to the Danube.

Maine, called the PINE TREE STATE because of the vast extent of pine forests which once existed within its limits, is one of the New England group of North Atlantic States. It is



MAINE

1, Augusta; 2, Portland; 3, Bangor; 4, Biddeford.
Dotted lines indicate chief railroads.

the most northeasterly state of the Union, lying between latitude $43^{\circ}4'$ and $47^{\circ}28'$ n. and between longitude $66^{\circ}57'$ and $71^{\circ}7'$ w. It is bounded on the n. w. by Quebec, on the n. e. by New Brunswick, on the s. e. by the Atlantic Ocean, and on the w. by New Hampshire. The extreme length of the state is 303 miles, and the extreme width is 212 miles. The total area is 33,040 square miles, of which a little more than 3000 square miles are water surface. The coast in a direct line from Eastport to a point opposite Portsmouth is 218 miles, but because of the numerous indentations Maine has really about 2500 miles of seacoast. There are proportionally more good harbors on the coast of Maine than on any other part of the Atlantic coast. Population in 1900, 694,466.

SURFACE AND DRAINAGE. The surface is moderately hilly. A height of land, rising 2000 feet above sea level, where it enters the state from New Hampshire, crosses from southwest to northeast, dwindling to 600 feet where it reaches the Canadian boundary. There is no mountain range, but the spurs and scattered groups of mountains are really extensions of the Appalachian system. The principal mountains are Mt. Katahdin, 5385 feet; Mt. Abraham, 3387 feet; Mt. Bigelow, 3600 feet; Saddleback Mt., 4000 feet, and Mt. Blue, 3900 feet; Bald Mountain, Mt. Kineo, and Mt. Haystack are also well known.

The portion of the state north of the main divide is drained almost wholly by the St. John River and its tributaries; the southern portion is drained by the Penobscot, Kennebec, Androscoggin and St. Croix Rivers. These are swiftly flowing rivers which furnish a magnificent water power.

There are more than fifteen hundred lakes in Maine, of which Moosehead Lake and the Rangeley Lakes are the most famous.

CLIMATE. The climate of Maine is cold for a large part of the year; snow covers the ground from three to five months. The summers are short and hot, and even in the southern portion the farmer has not more than five months in which to mature his crops. The prevalence of forests, the fine river drainage, and the sea breezes have all tended to make the climate of Maine both healthful and delightful.

MINERALS. Granite is found in large quantities in the southern part of the state, and the quarrying and shipping of this stone form the chief mineral industry. Hallowell and Dix Island furnish the greatest amount of granite. The capitol at Albany, and the Metropolitan Museum of Art, New York City, are built of Hallowell granite. Large quantities of lime are made from the extensive limestone deposits of Knox county. A good quality of slate is found in the central part of the state. It is quarried for table tops, blackboards, roofing, and finishing interiors. The slate from Piscataquis county is remarkably pure, is of a deep black color and can be split into thin plates. In some localities there are deposits of feldspar and silica of excellent quality. Some of the products made wholly or in part of this feldspar and silica are glass, porcelain, sandpaper, scouring soap, and earthenware. There is a famous tourmaline deposit in Oxford county from which the largest and most beautiful

crystals known have been taken. There are in the state about thirty mineral springs of commercial importance. Water from the famous Poland Spring is shipped even to foreign countries.

FORESTS. Maine is one of the leading states in the Union in the extent of its forest area and the annual value received from the forest products. In 1900 the woodland covered more than three-fourths of the total area. The primeval forests of pine are all gone, and a good-sized second growth is now furnishing material for the lumber mills. The spruce forests are the most extensive and the most heavily drawn upon at the present time. A belt of white birch, extending across the state, furnishes wood for spools. This spool timber is shipped extensively to Scotland. In 1900 almost one-half the spool stock of Great Britain came from Maine. Large quantities of cedar are found in the St. John and Penobscot basins. Because of the rapid destruction of forests, both the state and private corporations are taking active measures for the preservation of the timber, and the reforestation of denuded areas.

FISHERIES. The fisheries rank second in importance among those of the New England states. In the coast waters are large quantities of lobsters, clams, and mussels; in the bays and fiords are rock-cod, sculpin, bluefish, cunners, and flounders; while in the off-shore waters are cod, herring, halibut, haddock, mackerel, hake, porgy, menhaden, and pollock. One of the smaller species of herring furnishes a large amount of the fish used in the sardine canning industry of Lubec and Eastport. The rivers and lakes are so well stocked with the choicest fish that Maine is considered the sportsman's paradise. The salmon fishing is largely in the Penobscot and Kennebec.

AGRICULTURE. The soil in the greater part of the state is not very well adapted to agriculture. Along the river valleys, however, and in Aroostook county, are many excellent farms. The chief crops are potatoes, hay, oats and wheat. Apples are successfully raised in a number of counties. The finest sweet corn in the world is raised in large quantities for canning, and is shipped to all parts of the world. The dairy products are second in value only to those of Vermont among the New England states.

MANUFACTURES. The rivers flow swiftly over rocky beds, and the consequent extensive water power has made Maine an important manufacturing state. Shipbuilding was one

of the first manufacturing industries. Bath was the chief shipbuilding center of the United States for a hundred years, and is still engaged in this industry, though now the building is chiefly of steel vessels. Lewiston, Biddeford and Saco are very extensively engaged in the manufacture of cotton goods. Immense quantities of paper and wood pulp are manufactured in Maine. Large quantities of lime are made in Knox county. Other important manufactures are woolens, leather, lumber products, and foundry products.

TRANSPORTATION. The coast of Maine abounds in good harbors, and the Penobscot and Kennebec are each navigable for about sixty miles. Thus Maine has always had convenient water transportation. Portland is connected by fine steamers with Boston, New York, and the Provinces, and is the port for several trans-Atlantic lines. Railway lines cross the state from east to west and from north to south. Two of these, the Grand Trunk and the Canadian Pacific, are important trunk lines, connecting with other great systems of the United States and Canada, thus giving direct communication with the central and extreme western portions of the country. Another important system, the Boston & Maine, makes similar connections through Boston and New York with the Southern states, while the Maine Central connects various places within the state. The state has more than 2000 miles of railway lines, besides numerous electric lines which are being extended every year. Portland is the chief railway center.

GOVERNMENT. The legislature consists of a senate of 31 members and a house of representatives of 151 members elected biennially by popular vote. The senators are chosen from the counties, which are the senatorial districts. The representatives are elected from towns. The governor is chosen by popular vote for a term of two years. His council, consisting of seven members, also the secretary of state, the state treasurer, and the attorney-general, are elected by joint ballot of the legislature. As in the other New England States, the local government is largely in the hands of town officers. The Supreme Court comprises eight judges appointed by the governor and council for a term of seven years. The judges of the two special courts in Kennebec and Cumberland counties, known as superior courts, and the judges of the inferior courts, except the probate courts, are also appointed by the governor and

council. The probate judges are chosen at popular election for a term of four years.

EDUCATION. The town system of common schools is in use, the town being the smallest unit for their administration. In general the schools are well organized and well taught. A state superintendent of schools is appointed by the governor and council for a term of three years. The state has a considerable school fund, which is supplemented by a state tax of three mills on each dollar of the valuation, and by a local tax under the state law that every town shall raise annually not less than eighty cents per capita of all inhabitants. A compulsory school law which covers the ages of seven to fifteen is well enforced. All cities and the larger towns maintain graded schools and high schools. There are state normal schools established at Castine, Farmington, Gorham, and Presque Isle; and by vote of the legislature in 1909 there is to be one established at Machias. Other prominent educational institutions are Bowdoin College at Brunswick, the University of Maine at Orono, Colby College at Waterville, Bates College at Lewiston, and the Maine Wesleyan Seminary and Woman's College at Kent's Hill.

INSTITUTIONS. The school for the deaf is in Portland, as is also the Maine General Hospital and a United States marine hospital. There is a United States soldiers' home at Togus. The hospitals for the insane are at Augustus and Bangor; there is an orphans' asylum at Bangor, and a military and naval orphans' asylum at Bath. The state prison is at Thomaston, the state school for boys at South Portland, and the state industrial school for girls at Hallowell.

CITIES. The chief cities are Augusta, the capital, Portland, Lewiston, Bangor, Biddeford, Auburn, Bath, Waterville, Rockland, Calais and Westbrook, each of which is described under its title. Bar Harbor, Mount Desert Island and Old Orchard Beach are famous as watering places.

HISTORY. Maine was visited by the earliest explorers, probably by the Norsemen about 1000 A. D., by Verrazano in 1524, by Sir John Hawkins in 1565, by Gilbert in 1583, by Gosnold in 1602, and by John Smith in 1614. The first English settlement was established at the mouth of the Kennebec River in 1607, under the auspices of the Plymouth Colony, and was directed by George Popham, but owing to the rigorous climate the settlement was abandoned in the following spring. In April, 1622, Sir Fernando Gorges and George Mason received the grant of land between the Merrimac and the Kennebec.

In 1629 this was divided and Gorges received the strip between the Piscataqua and the Kennebec. A settlement was made at York, which was the first chartered city in America. Later settlements were made at Saco, Biddeford and Scarborough, but all were destroyed by Indian uprisings, and in 1677 Massachusetts purchased the whole territory, which was united with it by charter in 1692. It did not again have a separate existence until it was admitted to the Union as a state in 1820, to offset the admission of Missouri as a slave state. (See *MISSOURI COMPROMISE*.) From that time until the Civil War, the only important public questions in the state were the dispute over the northeast boundary, which was finally settled by the Webster-Ashburton Treaty of 1842; and the enactment in 1851 of a law prohibiting the manufacture and sale of intoxicating liquors. This law, in 1884, became an amendment to the constitution. In the Civil War the state furnished more than 70,000 men to the Union army. Maine has never had any serious internal trouble. The Australian ballot law was passed in 1891.

Maine, UNIVERSITY OF, a state university, established at Orono in 1867, under the name of the State College of Agriculture and Mechanic Arts. This was changed to the present name in 1897. The present organization includes a school of arts and sciences, which offers classical, Latin, scientific and general scientific courses; a school of engineering, a school of agriculture, a school of pharmacy and a school of law. The university is co-educational. Its faculty numbers about sixty, and there are about 500 students enrolled. The income, including state and government appropriations, is about \$106,000. The number of volumes in the library is 22,000.

Maintenon, *maN t' nohN'*, FRANÇOISE D'AUBIGNÉ, Marquise de (1635-1719), second wife of Louis XIV. Left quite destitute in her tenth year, Mademoiselle D'Aubigné spent her youth in dependence on her rich relatives, and was glad to contract a marriage with the famous wit Scarron, a deformed, old and infirm man. Her beauty and intelligence gained for her powerful friends among those who frequented her husband's house; and on Scarron's death she was intrusted with the charge of the children born to Louis XIV by Madame de Montespan. She assumed this office and soon so captivated the king that he married her privately in 1684. For the remaining years of his life she was his most confidential adviser.

Mainz, *mine ts*, a fortified town of Germany, in the grand duchy of Hesse, finely situated on the left bank of the Rhine, opposite the mouth of the Main, 20 mi. w. s. w. of Frankfort. The older part of the town was modernized after the destruction caused by a powder-magazine explosion in 1857, and an extensive new quarter has been added since the recent widening of the fortified circuit. The city contains a fine statue of Gutenberg, by Thorwaldsen. The manufactures embrace leather, furniture, hardware, carriages, tobacco, beer, chemicals, musical instruments and cars. The trade, particularly transit, is extensive. Mainz was for long the first ecclesiastical city of the German Empire, of which its archbishop-electoral ranked as the premier prince. Its history during the sixteenth century is of considerable interest in connection with the progress of the Reformation. Population in 1901, 84,251.

Maitland, WILLIAM (1528?-1573), a Scotch statesman, commonly known as Secretary Lethington, because he was the son of Sir Richard Maitland of Lethington. In 1560 he was a speaker in the Parliament which abolished the authority of the pope in Scotland. When Mary Stuart arrived in Scotland from France, he was chosen one of her principal ministers, and was continually employed as her agent at the English court. He took part in the plot against Rizzio and knew of Bothwell's plot against Darnley, for supposed complicity in which he was later arrested. He kept up an active correspondence with Mary, and after the death of Murray he became the leader of the queen's party. He was therefore proclaimed a traitor by Parliament and thrown into prison, where he died.

Maize, one name of the common corn, or indian corn. See CORN, INDIAN.

Majesty, a title bestowed upon kings and queens. The former kings of France were addressed as "most Christian majesty," the kings of Spain as "most Catholic majesty," the kings of Portugal as "most faithful majesty," the kings of Hungary as "apostolic majesty." The emperors of Germany and Austro-Hungary have the title of "imperial royal majesty."

Majolica or **Maiolica**, a beautiful enamel earthenware, decorated in colors and made in Italy. There the term is applied to all such wares, but by artists it is restricted to such as are decorated with a fine metallic luster or to the richly decorated wares of the fifteenth and sixteenth centuries. The most famous and beautiful majolica was made in the towns of

northeastern Italy, where plates, platters, bowls, vases, pitchers and unique forms of bottles or flasks constituted the most commonly decorated objects, though the ware was sometimes used in tiling for floors and walls. See POTTERY.

Ma'jor. See MUSIC; SCALE.

Majorca (Spanish *Mallorca*), an island in the Mediterranean, belonging to Spain, the largest island of the Balearic group, about 58 mi. in length and about 1330 sq. mi. in area. It is very irregular in shape and deeply indented. The west and north coasts, which look towards Spain, are steep and lofty, but in other directions, and particularly on the east, the coasts are low and shelving. The island is generally fertile, producing, besides large crop of cereals, hemp, flax and fruits. Silk is also raised. The pastures are rich and maintain large numbers of cattle, and the fisheries on the coast are valuable. Several railways traverse the island. The chief town is Palma. Population in 1900, 230,396.

Makaw', a small tribe of indians who live near the entrance to Puget Sound. They are skilful and daring fishermen and boatmen and in former times were warlike in nature. The women weave beautiful baskets. Unlike other indians, the men have beards. The Makaws live upon a small reservation and are fairly civilized.

Malac'ca, a town forming part of the British colony of the Straits Settlements, on the west coast of the Malay Peninsula. It is one of the oldest European settlements in the East, having been founded by the Portuguese in the early part of the sixteenth century. The Dutch gained possession of it in 1641 and the English in 1824. Population, about 20,000.

Malacca, STRAIT OF, the channel between the Malay Peninsula and the island of Sumatra. In length it is a little over 500 miles, and in width it varies from about 30 miles to 190 miles.

Malachite, *mal' a kite*, a carbonate of copper, of a dark, emerald-green color. The finest specimens are obtained from Siberia and Arizona, but it is found in many places all over the world. Fibrous malachite, when finely pulverized, is used as a paint; massive malachite is made into boxes, knife-handles, table-slabs and other ornamental articles and is susceptible of a beautiful polish.

Mal'aga, a seaport of southern Spain, the capital of a province of the same name in Andalusia, on the Mediterranean. There are some interesting ancient buildings and a number of imposing modern structures. The manufac-

Malaria

tures consist chiefly of iron, the ore of which is obtained from mines in the vicinity; soap, cottons, leather and paper. The trade is of much importance, the principal exports being olives, wine, figs, almonds, raisins and lead in bars. The climate is perhaps the mildest and most equable in Europe. Malaga was a flourishing city under the Romans, and its long occupation by the Moors left distinct marks in the older parts of the town. Population in 1900, 131,063.

Mala'ria, a name sometimes given to air tainted by poisonous emanations from animal or vegetable matter, especially the exhalations of marshy districts, which were supposed to produce fevers. A class of diseases, among which intermittent and remittent fevers occupy a prominent place, have been known from a very early period to be especially prevalent in marshy districts, where they are promoted at particular seasons by certain conditions of heat and moisture. The emanations from decaying animal or vegetable matter were formerly supposed to be the direct cause of the disease, but recent investigations have shown that the immediate cause of such diseases is the presence of bacteria in the blood, and that these bacteria are carried from the decaying substances, in which they were bred, to the human body by the aid of the mosquito (See GERM THEORY OF DISEASE). At one time the Campagna, or great plain surrounding the city of Rome, was fertile and thickly populated, but for centuries it has been almost deserted because of the malarial diseases prevalent there. Large tracts on the western coast of Africa and in parts of India are dangerous to whites for the same reason. By attention to drainage and the destruction of the breeding places of mosquitoes, many of these localities may be made safe places of abode.

The word *malaria* is now applied to a disease which manifests itself as a chill followed by fever, perspiration and general weakness and prostration. Common names for this disease are *ague* and *chills and fever*. The attacks recur with perfect regularity, at periods of from one to four days, according to the life period of the bacillus which causes the attack. See MOSQUITO.

Malay' Archipelago, also known as the Indian or Eastern Archipelago, the great group of islands situated to the southeast of Asia and washed on the west by the Indian Ocean and on the east by the Pacific Ocean. The archipelago lies, approximately, between the parallels of 11° south latitude and 17° north latitude. Within

Malden

these limits lie some of the largest and finest islands in the world, as Borneo, Sumatra, Java, Celebes and the Philippines; New Guinea is not ranked as belonging to the group. The chief of the smaller islands are the Moluccas, or Spice Islands, Billiton, Banca, Madura, Bali, Lombok, Sumbawa, Flores and Timor. The islands are generally fertile and are covered with a luxuriant vegetation; they produce all kinds of tropical products in abundance. Many of them contain volcanoes. The chief native race is the Malayan. A large portion of the archipelago is really, or nominally, under the sway of Holland, and this portion is frequently called the Dutch East Indies.

Malay Peninsula or **Malacca**, the most southern part of continental Asia, the long narrow projection that stretches first south, then southeast, from Siam and Burma. It is connected with Lower Siam by the Isthmus of Kra, has on the east the Gulf of Siam and the China Sea and on the west the Strait of Malacca. It varies in width from about 50 miles, at the Isthmus of Kra, to about 210 miles, and the area is about 90,000 square miles. The country is mountainous, with peaks from 7000 to 8000 feet high, is densely wooded and has numerous short rivers. Of the minerals, the most important is tin, which is found in great quantities and is largely exported. Politically the peninsula belongs partly to Great Britain and partly to Siam. There are a number of small states, governed by native chiefs, which are protectorates of Great Britain. The native races are Siamese, Malays and Negritos. The population is variously estimated at from 1,000,000 to 2,000,000.

Malay Race or **Brown Race**. See RACES OF MEN.

Malden, *maw' den*, MASS., a city in Middlesex co., 5 mi. n. of Boston, on the Malden River and on the Boston & Maine railroad. It is an important manufacturing center, with more than six hundred establishments and almost fifty different industries. The chief products are rubber, boots and shoes, shoe lasts, boot trees, leather, paper, fiber and knit goods, furniture and other articles. The city has excellent schools, a Y. M. C. A. and many fine church buildings, four libraries, a home for the aged and a city hospital. The place was settled in 1641 and remained a part of Charleston until 1649. It was chartered as a city in 1881. Population in 1905, including several villages, 38,037.

Mal'dive Islands, a chain of islands in the Indian Ocean, extending from latitude $0^{\circ} 45'$ south to $7^{\circ} 6'$ north, nearly on the meridian of $73^{\circ} 30'$ east. The chain is composed of seventeen clusters of atolls. The larger islands are covered with trees, chiefly palm, and produce fruits, various kinds of edible roots and millet. All kinds of fish are found about the islands, and the inhabitants carry on a considerable trade with Bengal, Ceylon and the Malabar coast. A sultan rules over the islands, which are inhabited chiefly by Singhalese, who are Mohammedan in faith. Population, about 30,000.

Malibran, *ma le brahN'*, MARIA FELICITA (1808-1836), a contralto vocalist, one of the greatest singers of modern times. She was the daughter of a well-known singer and singing master, Manuel Garcia, and made her debut in 1825 in London. The following year she went to New York, where she married M. Malibran, a French banker, from whom she soon separated. She returned to Europe, where her splendid vocal powers and dramatic ability made her a favorite. Having obtained a divorce from her first husband, she married the violinist De Bériot.

Malice, *mal' is*, in law, a formed design or intention of doing mischief to another, called also *malice prepense* or *malice aforethought*. *Malicious mischief* is the committing of an injury to public or private property from sheer wantonness. This offense is punishable with great severity. The law presumes malice in the very commission of the act; so it lies with the party indicted to rebut the presumption of malice or sufficiently to explain the act. See MURDER.

Malines, *ma leen'*. See MECHLIN.

Mal'leabil'ity, a property of matter by virtue of which it can be hammered or rolled into sheets. Malleability is confined almost entirely to metals, and there are but few metals that are not malleable. Those possessing this property in the highest degree are, in the order named, gold, silver, copper, platinum, iron, aluminum, tin, zinc and lead. See GOLD BEATING.

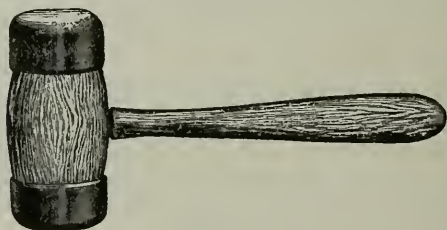
Mal'let, a small wooden hammer, or beetle, used by carpenters and others, for driving another tool, as a chisel. It has a small handle and is used with one hand. The name is also given to the long-handled tool used to drive croquet balls. Other small mallets are used by jewelers and dentists.

Mal'lock, WILLIAM HURRELL (1849-), an English author. He was educated at Balliol

College, Oxford, where he gained the Newdigate prize for a poem on *The Isthmus of Suez*. His writings, whether political, philosophical or fictional, deal mostly with current questions. Among his publications are *The New Republic*, *The New Paul and Virginia*, *Is Life Worth Living?*, *A Romance of the Nineteenth Century*, *The Old Order Changes*, *A Human Document* and *The Heart of Life*.

Mal'lory, STEPHEN RUSSELL (1813-1873), an American politician, born at Trinidad, West Indies. He was appointed inspector of customs at Key West in 1832, seven years later was admitted to the bar, served in the Seminole Wars and from 1851 to 1861 was United States senator from Florida. He retired in the latter year to enlist in the Confederate service, but was appointed secretary of the navy of the Confederacy, where he served until the close of the war. He was captured in 1865, but was released in the following year and returned to the practice of law.

Mallory, STEPHEN RUSSELL (1848-), an American lawyer and politician, born in Florida, the son of Stephen R. Mallory, former United States senator from Florida. He entered the Confederate army in the fall of 1864 and in the



MALLET

following spring entered the navy, where he served until the close of the war. He graduated at Georgetown College in 1869, was admitted to the bar in 1873 and in the following year began practice at Pensacola, Fla. He was elected to the state legislature in 1876 and in 1891 was chosen to Congress as a Democrat. He was elected to the United States Senate in 1897 and was reelected in 1903.

Mal'low, the common name of a genus of plants and of a much larger family. The common mallow is a widely diffused species, with reddish-purple flowers, that on drying become blue and yield their coloring principle both to water and alcohol. The dwarf mallow is also a native of Britain. Its stems, which are short, simple and spreading, rise from a long, deeply buried root. Its leaves are of a handsome,

round, heart-shaped form, somewhat lobed and scalloped on their edges; the flowers are white, violet-white or purplish, and the fruits are flat and circular. The musk mallow has handsome, deeply cut leaves, which diffuse a pleasant, musky odor. Both species have become naturalized in the United States.

Malmö, *mahl' mö*, a seaport of Sweden, capital of the prefecture of Malmöhus, situated on the Sound, opposite Copenhagen. It is the terminus of eight railway lines, has steamship connection with many European cities and is connected by ferry with Copenhagen. The chief buildings are the city hall, which dates from the sixteenth century, the governor's residence and several churches. The manufactures are considerable and consist chiefly in iron, cottons, tobacco, gloves, brandy, chocolate and cars. Population in 1904, 70,797.

Malone, N. Y., the county-seat of Franklin co., 60 mi. e. of Ogdensburg and 12 mi. from the Canadian line, on the Salmon River and on the New York Central and other railroads. The village is on the northern foothills of the Adirondacks, in an agricultural region producing hops, hay, potatoes, poultry and dairy products. The industries include tanneries, woolen, paper and flour mills, foundries, machine shops and woodworking establishments. It is the seat of the Northern New York Institution for Deaf Mutes and of Franklin Academy. The first settlement was made in 1802. Population in 1905, 6478.

Malory or **Mallore**, THOMAS, Sir, an English author, about whom little is known, save that he flourished in the latter half of the fifteenth century. He is famous as the author of the *Morte d'Arthur*, which contains the stories of Arthur and the Round Table which Tennyson afterward utilized in the *Idylls of the King*. These tales were probably translated into English from old French romances, and they form the first important English romance in prose.

Malpighi, *mal pee' ge*, MARCELLO (1628-1694), an Italian physician celebrated for his anatomical discoveries made in the dissection of animals. Among the facts he learned are the spiral structure of the heart muscles and the structure of glands. Besides his achievements in anatomy, his industry and great originality enabled him to make almost equally important discoveries in botany and entomology.

Malt, *mawlt*, grain, usually barley, steeped in water and made to germinate. The starch of the grain is thus converted into sugar, after

which it is dried in a kiln and then used in the brewing of porter, ale or beer, and in whisky distilling. One hundred parts of barley yield about ninety-two parts of air-dried malt. See BREWING.

Malta, *mawlt' tah*, an island in the Mediterranean, belonging to Great Britain, 58 mi. s. s. w. of Sicily and 180 mi. from Africa. Its area is about 95 square miles, to which the adjoining islands of Gozo and Comino, Cominotto and Tilfla add 22. The most important indentation is the double bay on which the capital, Valetta, an important naval station, stands. The greatest elevation of the island is about 845 feet. There are only a few small streams, but the springs are so numerous and copious that no deficiency of water is felt. Corn, cotton, potatoes and clover are the chief crops. Both the vine and the olive are cultivated, and fruits, particularly figs and oranges, are very abundant. The manufactures consist of cotton goods, lace, jewelry and lucifer matches. The climate is very hot in summer, but pleasant and healthful in winter, attracting many visitors at this season. Malta was held by the Knights of the Order of Saint John of Jerusalem from 1530 until 1798, when it was surrendered to Napoleon Bonaparte. It was taken from the French by the British in 1800, and it was finally annexed by them in 1814. The people are mainly of Arabic race, and speak a kind of Arabic mixed with Italian. Italian and English are also spoken. The educational institutions include a university, a lyceum, two secondary schools and many primary schools. Besides the capital, Valetta, and the three cities adjoining, there are several considerable towns or villages. Population, including a garrison of over 10,000 British troops, 202,134.

Malta, KNIGHTS OF. See JOHN, KNIGHTS OF SAINT.

Malthus, THOMAS ROBERT (1766-1834), an English political economist. In 1805 he was appointed professor of history and political economy in the East India Company's College at Haileybury, an office which he held till his death. He first published the views with which his name is associated in his *Essay on the Principle of Population as it Affects the Future Improvement of Society*. His leading principle is that population, when unchecked, goes on increasing in a higher ratio than the means of subsistence can, under the most favorable circumstances, be made to increase; that the great natural checks to excessive increase of popula-

tion are vice, misery and moral restraint, and the great business of the enlightened legislator is to diminish the first two and give every encouragement to the last.

Mal'vern Hill, BATTLE OF, an important battle of the Civil War, fought near the James River, at Malvern Hill, Va., July 1, 1862, between the Federal Army of the Potomac of about 80,000 men, under General McClellan, and the Confederate Army of Northern Virginia, about equal in numbers, under General Lee. It was the last of the "Seven Days' Battles" and practically terminated the Peninsula Campaign. The Federals held the hill, naturally a strong position, and the Confederates were compelled to begin the assault. Though conducted with the greatest bravery and skill, the attack failed, and Lee's force was compelled to withdraw with a loss of fully five thousand. The loss of the Federals was about one-third of that number.

Mamar'oneck, N. Y., a town of Westchester co., situated on Long Island Sound and on the New York, New Haven & Hartford railroad, 20 mi. from New York City. It is a beautiful residence place and has many handsome dwellings belonging to New York business men. Population in 1905, 5090.

Mam'elukes, the former mounted soldiery of Egypt, consisting originally of Circassian slaves. As early as 1254 they became so powerful that they made one of their own number sultan, and this dynasty continued till the sixteenth century, when it was overthrown by Selim I. They suffered severely in opposing the French at the end of the eighteenth century, and in 1811 Mehemet Ali caused a general massacre of them throughout Egypt.

Mam'ertine Prison, THE, one of the oldest of the remains which exist of ancient Rome. It is supposed to have been begun in the time of Ancus Martius, but additions were made to it as late as the time of Tiberius. Many of the most famous events of Roman history were intimately connected with the Mamertine Prison. It was here that Jugurtha was allowed to starve and that several of the Catiline conspirators were put to death.

Mamma'lia, the highest class of the vertebrates and of the animal kingdom, including all those warm-blooded animals that suckle their young. The latter is the one distinctive characteristic, and in all excepting the lowest orders the young are brought into the world alive and feed themselves upon the mother's milk; but in some of the lower orders the young are not fully

developed when born and are carried and fed by the mother. The higher we ascend the scale of life, the longer is the period through which the young are more or less dependent upon their parents.

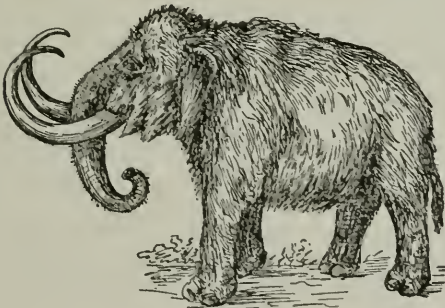
The skin of mammals is always covered more or less with hairs, which are found in many forms, from the finest wool to large, coarse bristles and even spines. The skeleton is quite uniform in essentials, and in most points it agrees with that of man. The skull forms a single piece, composed of bones fixed together, to which is articulated a lower jaw. The skull rests upon the vertebral column, to which limbs, never more than four in number, are attached. The fore limbs are invariably present, but the cetaceans and some other mammals have no hind limbs, or they appear only in rudimentary form. Most mammals have teeth, but they appear only in embryo in the whales and are entirely absent in the ant-eater and some other forms. The muscles of mammals are well-developed and perfect, resembling the birds in this respect. The diaphragm, which divides the body cavity in two, is peculiar to mammals. Air is breathed directly into the lungs, even by the whales and other water-living animals. All have warm red blood, which is driven by a four-chambered heart to all parts of the body through distinct vessels called arteries, and which returns through another set of tubes to the lungs for purification. The anatomy of all mammals is so similar to that of man that the student is referred for greater detail to the separate articles in this work descriptive of the organs of man.

No mammals existed in New Zealand nor the Polynesian Islands until they were introduced by man. The marsupials, or animals which carry their young for a time in pouches, are confined to the Australian region and the one genus opossum in America. Otherwise mammals are distributed widely in all parts of the world. Mammals are so well adapted for life under varying conditions that they have been carried from their native haunts, and concerning the original home of many we now have no information. The apes, monkeys and those mammals which are most closely related to man in structure inhabit the tropical or sub-tropical regions. The character of mammals seems to be largely dependent upon their food and surroundings. Those which live upon other animals are fierce and active and highly intelligent, living comparatively solitary lives.

Mammoth

On the other hand, the vegetable-eating mammals are comparatively timid and often herded together; though many bear weapons of defense, most of them trust to their fleetness or to their ability to conceal themselves in order to escape from their enemies. Of course many mammals combine vegetable and animal food in varied proportions. Mammals have been variously classified, but the authority of Cuvier is generally recognized in the main, though recently a more perfect arrangement of some divisions has been made. Two primary classes are recognized, the smaller of which is composed of those animals provided with a temporary pouch in which the young are hatched; they are known as the Monotremata (See DUCK-BILLED PLATYPUS). The second subclass includes all the remaining families, namely, Marsupialia, Edentata, Ungulata, Sirenia, Cetacea, Carnivora, Rodentia, Insectivora, Chiroptera and Primates. By reading the articles on these families, and the cross references therein, a very satisfactory idea of the Mammalia and its principal members may be obtained.

Mam'moth, a species of extinct elephant, the fossil remains of which are found in Europe,



MAMMOTH

Asia and North America. Geologically speaking, the mammoth dates from before the Glacial period, which it survived, and lived into the earlier portion of the human period. Its bones and large curved tusks have been found in great abundance in Siberia. An entire carcass, which had been preserved in the ice, was discovered toward the close of the eighteenth century on the banks of the river Lena, in such a perfect state that the flesh was eaten by animals. The skin was perfectly preserved and was clothed with a furry wool of reddish color, interspersed with black hairs. The skeleton and other parts of this animal are preserved in the St. Petersburg Royal Museum. It must have

Man

been twice as bulky as the elephants living at the present time.

Mammoth Cave, the largest known cave in the world, situated in Kentucky, near Green River, about 80 mi. s. w. of Louisville. It is one of a series of large caverns, formed in limestone rock which extends over an area of about eight thousand square miles, including portions of Kentucky, Tennessee and Indiana. The cave is about ten miles in diameter, and passageways aggregating more than one hundred miles in extent have been explored. The main cave is three miles long and from 40 to 175 feet in width, and in some places it is 125 feet high. The largest room, known as the Chief City, is oval in form, 541 feet long, 287 feet wide and 125 feet high. There are numerous other very interesting rooms, among which is the Star Chamber, a dome with a lofty ceiling of black rock, dotted with snow-white crystals of gypsum, which, when seen by reflected light, glisten like stars. The cave contains a number of rivers and small lakes. The largest, Echo River, is about three-fourths of a mile long and obtains its name from the wonderful echoes produced in the portion of the cave through which it flows.

As far as explored, there are five altitudes, or levels, and from the pit descending to the lowest of these a number of passageways have been discovered. These passageways undoubtedly lead to other chambers of great interest. The rivers contain numerous blind fish, and blind grasshoppers, beetles and other insects are found in the cave. Mammoth Cave was discovered in 1809 and was first brought to general attention through large deposits of saltpeter found there and used for the manufacture of gunpowder during the War of 1812. See CAVE. Consult Hovey's *Celebrated American Caverns*.

Man, the most highly organized being in the animal world. Though many attempts have been made to classify man as entirely separate from the rest of the animal kingdom, yet the more recent studies show him physically to belong to the highest family, in the group of apes and monkeys. But in mental endowments man ranks far above the highest of the apes. Again, he walks erect upon his feet and uses his hands solely for the purpose of taking and holding things; the bones of his face do not project forward, but rather downward, and are immediately below his brain; he has much greater cranial capacity than any other animal, and the convolutions of his brain are far more numerous

and complex; his teeth are arranged close together; his hair covers only restricted areas of the body, and in various other minor ways man shows his difference from the apes. Man possesses a reasoning mind and has a moral sense of right and wrong; he possesses an articulate language, by which he can communicate his thoughts readily—gifts which no other animal ever possessed. The gorilla, orang-outang and chimpanzee most closely resemble man, the latter differing less than any of the others.

Where man originated or how he became distributed over the earth are questions which no one can settle. Darwin believed that he was directly descended from some form of anthropoid ape now extinct and that all present races have come from one parent stock. Wallace believes a portion of this doctrine, but thinks that man has been especially endowed by his Creator with a high, controlling intelligence. Other great scientists believe that the race has been developed from separate beginnings and deny the supernatural creation of mind or soul.

Man, ISLE OF, an island in the Irish Sea, almost equidistant from England and Ireland and 15 mi. s. of Scotland. Its area is about 227 square miles. A range of hills extends throughout nearly the entire length of the island, culminating in Snaefell, about 2030 feet above sea level. Lead and zinc are extensively mined, and silver is found in considerable quantity. Fishing is an important industry. The island, which is inhabited chiefly by the Manx, a people of Celtic race, was purchased early in the nineteenth century by the British government. It is ruled by a governor appointed by the English crown, and the legislative authority rests with the House of Keys. The Manx language is still in use, although all the inhabitants also speak English. The principal towns are Douglas, Castletown, Peel and Ramsay. Population in 1900, 54,758.

Managua, ma nah'gwa, a town in Central America, capital of the Republic of Nicaragua, on the shore of Lake Managua. It is connected with Granada by rail. Population, about 30,000.

Manar, ma nahr', **GULF OF**, a part of the Indian Ocean, between Ceylon and southern India. It is separated from Palk Strait by a reef, called Adam's Bridge, which runs between the islands of Manar and Ramisseram. The gulf is noted for its pearl fisheries.

Manasarowar, ma nah'sah ro wahr', a lake of Tibet, north of the main chain of the Himalaya

Mountains, between the sources of the Indus and the Brahmaputra. It is almost circular in form, is about 15 miles in diameter and is drained by the Sutlej.

Manatee' or Sea Cow, an animal which resembles the dugong, found on the coasts of South America, Africa and Australia. It generally frequents the mouths of rivers and feeds on algae and such land vegetation as it can reach at high tide. The animal is assisted in feeding by its peculiar upper lip, which is cleft in two and furnished with strong bristles. The manatee has no hind limbs, and the fore limbs, or swimming paws, are furnished with nails, by means of which the animal drags itself along the shore. Manatees are large, awkward animals, attaining a length of from eight to twenty feet. The skin is of a grayish-black color and is sparsely covered with hairs. The flesh and oil are both valuable.

Man'chester, a city, civic county, municipal and parliamentary borough and inland port of Lancashire, England, on the Irwell River, 32 mi. e. n. e. of Liverpool and 164 mi. n. n. w. of London. A ship canal, connecting it with the Mersey, enables the largest ocean steamers to enter the heart of the city (See MANCHESTER SHIP CANAL). On the west side of the Irwell is Salford, connected with Manchester by numerous bridges and considered as virtually a portion of the city. Manchester has many important and striking public buildings and many fine streets. The center of the town is largely occupied by immense piles of warehouses and offices, while factories and other manufacturing works are chiefly in the outskirts. Among the principal public buildings are the townhall, or municipal building, in the Gothic style, one of the finest modern buildings in England; the Assize Courts, also a fine specimen of modern Gothic; the Royal Exchange, and the new buildings of the Victoria University. The most noteworthy ecclesiastical buildings are the cathedral, a fine specimen of Perpendicular Gothic, built in the early fifteenth century, and the Church of the Holy Name. The chief educational institution is Victoria University. Chetham's Hospital was founded under the will of Humphrey Chetham for the education of poor boys. Attached to the institution is a library of 40,000 volumes, the first free library in Europe. Among the public monuments, the most noteworthy is the Albert Memorial, in front of the townhall.

The chief manufacture of Manchester is cot-

Manchester

ton, but woolen and silk fabrics are also produced. Metal manufactures, engineering and the making of all kinds of machinery employ many hands. The history of Manchester is legendary down to the tenth century, when the town was devastated by the Danes. In the twelfth century the woolen manufactures began to develop, and in 1301 the place received municipal liberties and privileges. During the civil war the town suffered much at the hands of both parties. The introduction of machinery in cotton spinning toward the end of the eighteenth century gave power and direction to the trade of modern Manchester, and its progress since has been extraordinarily rapid. A temporary check resulted from the Civil War in America, which led to a cotton famine in 1862, causing the deepest distress in South Lancashire. Manchester now returns six members to Parliament, while Salford has three members. Population of Manchester in 1901, 543,872; of Salford, 220,956.

Manchester, CONN., a town of Hartford co., 8 mi. e. of Hartford, on the New England railroad. The chief manufactures are silk, paper and woolen goods. Electric lamps and electrical power machinery are also made. Population in 1900, including several villages, 10,601.

Manchester, N. H., one of the county-seats of Hillsboro co., the largest city in the state, 17 mi. s. by e. of Concord, and 56 mi. n. by w. of Boston, Mass., on the Merrimac River at the mouth of the Piscataquog River, and on several lines of the Boston & Maine railroad. The city contains a public library, a training school for teachers, Saint Anselm's College, Saint Augustine and Saint Mary's academies, and a state industrial school, besides several charitable institutions. Other prominent structures are the Federal building, the courthouse, a Roman Catholic cathedral and several business blocks. Among the manufactures, boots and shoes are the most important, though cotton cloth was originally the greatest product. Other manufactures include fire engines and locomotives, hosiery, paper, woolen goods, needles, lumber and furniture. The place was settled by the Scotch-Irish in 1722, and was known under different titles until 1810, when it received its present name. It was chartered as a city in 1846. Population in 1900, 56,987.

Manchester, VA., a city in Chesterfield co., on the James River, opposite Richmond, and on the Southern, the Atlantic Coast Line and the Sea Board Air Line railroads. It has a pleasant

Manchuria

location and is connected with Richmond by several bridges. An agricultural region surrounds the city, and there are extensive coal mines in the vicinity. The industrial establishments include foundries, large flour mills, tanneries, brickyards, cotton and paper mills, railroad shops and other factories. Population in 1900, 9715.

Manchester Ship Canal, a canal extending from Manchester, England, to the estuary of the Mersey River, at Eastham. It is 35.5 miles long, twice as wide as the Suez Canal and has a depth of 26 feet. It was ready for traffic on Jan. 1, 1894, and was formally opened by Queen Victoria on May 21. The construction of this canal cost \$75,000,000. Through it the largest ocean steamers enter the heart of the city, which has six miles of wharfage and 100 acres of dock accommodations.

Manchuria, *man choo' re ah*, a Chinese territory, occupying the northeastern corner of the Empire. It is bounded on the n. and e. by the Amur and Usuri rivers, which separate it from Russian territory; on the s. e. and s. by the Gulf of Liao-tung, Korea and the Bay of Korea, and on the w. by Mongolia and the Argun River. The total area is about 360,000 square miles. Most of Manchuria is mountainous, but in the north there is a large stretch of land of steppe character. Although only about one-fifth of the arable land is now under cultivation, large crops of grain, cotton, tobacco, rhubarb, opium and potatoes are produced. The mountains are well covered with forests, the chief of which are pine, oak, elm and walnut. The majority of the population, which is estimated at about 17,000,000, is Chinese.

In the seventeenth century the Manchus invaded China and placed their leader's son upon the throne (See CHINESE EMPIRE, subhead *History*). Since that time the Manchu dynasty has continued to reign in China, and the Manchu language has become the court and official language. In 1898, as the price of her intervention in the interests of China after the close of the Chino-Japanese War, Russia obtained a lease of the harbors of Port Arthur and Ta-lien-wan. At the former a naval station was established, and at the latter the town of Dalny was founded as the port of Russia for her Siberian productions. During the Boxer trouble in China, Russian forces occupied Manchuria, and after the close of the struggle they were not withdrawn. The result was the war with Japan in 1904. Port Arthur, Dalny and

Mukden, the chief town of Manchuria, fell into the hands of the Japanese, and by the Treaty of Portsmouth, September 5, 1905, Russia was forced to withdraw her forces from Manchuria. See RUSSO-JAPANESE WAR.

Man'dalay, a city of India, the former capital of Burma, situated on the left bank of the Irawadi, 350 mi. n. of Rangoon, with which it is connected by railway. The town formerly consisted of four quadrangles, one within the other, in the innermost of which is the palace of the former king. This was surrounded by a second, which was fortified and surrounded by a moat and walls and used as a residential section for the government officials, while outside dwelt the general body of the inhabitants. A destructive fire in 1892 made it possible to rebuild quite a large portion of the city, and in doing this under British direction the town was greatly improved. The area covered is about six square miles. The streets are shaded and well lighted. The chief buildings are the former residence of the king, or palace, the government house and the hall of justice. The city also contains a number of temples, pagodas and monasteries, and it is celebrated for its grand bazaar, which is a market containing miscellaneous collections of wares. The most important industry is silk weaving. Population in 1901, 183,816.

Manda'mus. See WRIT.

Man'dan, once a large tribe of indians living in North Dakota. Few now remain after years of great disasters, which were, however, met with remarkable courage. The Mandans were driven about by the Sioux; smallpox depopulated their villages, and the tribe was almost forgotten. Yet a few kept faithfully their customs and habits, and, living clean lives, their numbers have increased somewhat. They stretched buffalo skins over a circular wooden framework and made awkward tub-like boats, which, however, they handled with much skill. They tattooed their breasts, and in some of their ceremonies they inflicted terrible torture upon themselves. In complexion they are very light, and albinos are frequently found among them. See INDIANS, AMERICAN, *color plate*, Fig. 1.

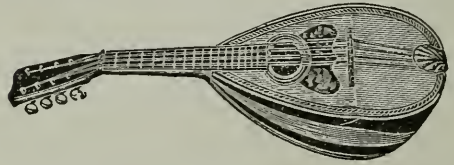
Mandarin, *man da reen'*, the term applied by Europeans to government officials in China. There are nine grades, each distinguished by the size and design of a gold button which the officer is required to wear in his hat. The Chinese equivalent for mandarin is *kwan*.

Man'deville, JOHN DE, Sir, the name adopted by the compiler of an extraordinary

book of travels, originally written in French, between 1357 and 1371. An English version was made from the French manuscript in the latter part of the fourteenth century. That part of the book which treats of the Holy Land may be a record of the author's experience, but the greater part is compiled from the accounts of various other travelers.

Mandin'go, a negro tribe of West Africa, remarkable for their intelligence and for the advances they have made in civilization. The original country of this people, who are now spread over a great portion of West Africa, was the north slope of the high tableland of Senegambia. They are nominally Mohammedans, are keen traders, work iron and gold, manufacture cotton cloth and leather and cultivate a variety of crops. They live in small independent states, in large, clay-built, walled towns.

Man'dolin, a musical instrument with a shell-shaped body, composed of strips of differ-



ent kinds of wood glued together, and with a neck like a guitar. There are from four to seven double strings, which are struck by a plectrum in the right hand, the fingers of the left stopping the strings on the fretted finger-board. A long note is produced by rapid striking of a single note many times in succession, producing a peculiar, tremulous tone.

Man'drake, the popular name of several plants, natives of south and east Europe and western Asia, not uncommon in America and Britain. One has large tap-roots, bearing clusters of rootleaves, and short stalks, upon which are the white, bell-shaped flowers. The fruit is a large, two-celled berry, of an orange color, containing many kidney-shaped seeds. The root possesses narcotic qualities, and from its occasional resemblance to the human figure it was formerly supposed by the superstitious to shriek when torn up. In the United States, the May apple, a very different plant, is sometimes called mandrake.

Man'drill, a species of baboon, which is distinguished by the short tail, the elongated, dog-like muzzle, an ugly-looking head, crowned with a crest of black hair, and an orange-yellow beard. The mandrills inhabit western Africa,

Manetho

where they associate in large troops. Full-grown males measure about five feet and are exceedingly strong and fierce. The mandrill has cheek swellings, colored with stripes of brilliant red and blue, and the nose is tipped with bright scarlet. See APE; MONKEY; BABOON.

Man'etho, an ancient Egyptian priest and writer, supposed to have lived about the middle of the third century B. C. Ptolemy II employed him to write a history of Egypt and its gods, selecting him because of his wide acquaintance with Egyptian, as well as with Greek, literature. This history, as well as all other works of Manetho, has perished, but extensive extracts have been preserved by later historians.

Man'ganeze, a metal of a dusky white or whitish-gray color, very hard and difficult to fuse. Exposed to air it speedily oxidizes, and it decomposes water with the evolution of hydrogen. The common ore of manganese is the dioxide, black oxide, or peroxide, a substance largely employed in the preparation of chlorine, for the manufacture of bleaching powder or chlorate of lime. Metallic manganese is obtained by reduction of the oxide by means of heat and finely divided carbon. It resembles iron in appearance and properties, is a constituent of many mineral waters and is employed in medicine. In steel manufacture, manganese is used in certain proportions with advantage (See STEEL), and in other manufacturing operations it forms an important element. Manganese ores are found in California, Colorado, Virginia, Michigan and other states of the Union, but not in quantity sufficient to supply the demand. Productive mines are found in Brazil and in Russia.

Mange, *maynj*, a skin disease which afflicts dogs and cattle and, under the name of *scab*, or *scabes*, sheep. It is due to the presence of a small mite, which burrows beneath the skin. The disease appears in the form of pimples, the animal suffers severely and in a short time the skin becomes covered with scabs. The disease is contagious and can be conveyed in numerous ways. The most successful treatment is by dipping the animal in solutions which will destroy the insect. These are usually solutions of tobacco and sulphur, lime and sulphur or carbolic acid. Preparations containing mercury and arsenic or other poisonous materials should not be used. In most regions where the disease is prevalent, farmers combine and construct dips, which are small tanks into which the animals can be plunged.

Manhattan Island

Man'go, the name of a genus of evergreen trees, which are natives of India and the Malay Peninsula, though they have been introduced into numerous tropical countries. In its native state the common mango grows to a height of about forty feet and has a spreading top with dense foliage, the leaves being from six to eight inches long. The flowers are small, reddish-



white or yellow and are borne in dense clusters. The fruit is kidney-shaped and varies considerably in size and color with different species. The best varieties of fruit are highly prized for eating. They are sweet or slightly acid. The unripe fruit is frequently used for sauces and pickles and other preparations. By cultivation the mango has been extended to most of the West India Islands and to Florida and California.

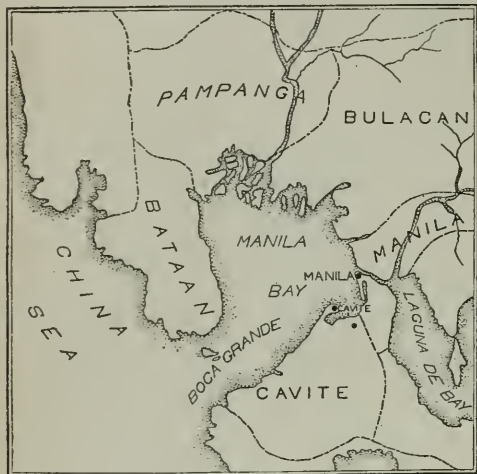
Man'grove, a genus of trees or shrubs which grow in tropical countries along the muddy beaches of low coasts, where they form impenetrable barriers for long distances. They throw out numerous roots from the lower part of the stem and also send down long, slender roots from the branches, like the Indian banian tree. The seeds germinate in the seed vessel, the root growing downward till it fixes itself in the mud. The fruit of some species is said to be sweet and edible, and the fermented juice is made into a kind of light wine.

Manhat'tan Island, N. Y., an island at the mouth of the Hudson River, constituting the Borough of Manhattan, in New York City. It is separated from the mainland on the north and northeast by the Harlem River. The maximum length of the island is $13\frac{1}{2}$ miles, the

width, $2\frac{1}{4}$ miles, and the area, 22 square miles. It has a wharfrage front of 22 miles. See NEW YORK (City).

Ma'nia. See INSANITY.

Manil'a, the capital of the Philippine Islands, situated on the western coast of the island of Luzon, at the head of Manila Bay, at the mouth of the river Pasig, which has been deepened so as to admit ocean-going vessels to the harbor. It consists of an old fortified city, with extensive



MANILA AND VICINITY

suburbs, in which live the greater part of the population, and a portion which contains the business premises, factories and warehouses. In San Miguel, which is built on an island formed by the Pasig, are the residences of the wealthy inhabitants. Manila is the center of the commerce of the Philippines, and it exports sugar, tobacco, cigars and cheroots, indigo, Manila hemp, coffee, mats, hides, trepang, rice and mother-of-pearl. It imports cloth and hardware from the United States and Great Britain, and a great variety of articles, such as tea and pottery, from China. The manufactures consist chiefly of cigars and cheroots and hemp and cotton fabrics. Manila was founded by Legazpi, the conqueror of the Philippine Islands, in 1571. It has frequently suffered from earthquakes, one of the most disastrous being that of 1863. The city was surrendered by the Spaniards to the American naval and military forces in the Philippines, Aug. 13, 1898 (See SPANISH-AMERICAN WAR). At that time the Philippine insurgents were surrounding the city, and in the early part of 1899 they broke through the American lines which invested the city and burned a considerable portion of it. In August, 1901, the

military government gave place to the new civil rule. Population in 1903, 219,928.

Manila Bay, BATTLE OF, an important naval battle in the Spanish-American War, fought in the bay at Manila, in the Philippine Islands, May 1, 1898, between an American fleet, under Commodore George Dewey, and a Spanish fleet of about equal strength, under Admiral Montojo, supported by land batteries. The American fleet, which, at the declaration of war, was in Chinese waters, had proceeded to the Philippine Islands and had entered the harbor at Manila during the night of April 30. At about 5:30 the following morning, a vigorous attack was begun against the Spanish vessels, which continued with brief interruption until 12:30 and resulted in the complete destruction of the Spanish ships and the silencing of the batteries. The Spanish loss was more than 600 killed and wounded, while the Americans had none killed and only 6 wounded.

Manistee', MICH., the county-seat of Manistee co., about 140 mi. n. w. of Lansing, on Lake Michigan, on the Manistee River near Lake Manistee, and on the Pere Marquette, the Manistee & Grand Rapids and other railroads. The city has a good harbor and ships considerable lumber, shingles and salt; fruit orchards are now taking the place of what was once a great lumber district. There are foundries, furniture factories, tanneries and other works. The important buildings include a fine courthouse and several good business blocks. Orchard Beach, a popular lake resort, is near here. The place was settled in 1841 and was chartered as a city in 1869. Population in 1904, 12,708.

Man'ito or **Manitou**, among certain of the North American Indians, a name given to whatever is an object of religious awe or reverence. The spirit of good and the spirit of evil are the two principal manitos.

Manito'ba, a Canadian province, bounded on the n. by Keewatin, on the e. by Keewatin and Ontario, on the s. by Minnesota and North Dakota and on the w. by Saskatchewan. The province is practically a square, measuring 270 miles on a side. The area is 73,732 square miles, of which 9405 square miles are water. It is a little smaller than North Dakota and Connecticut combined.

SURFACE AND DRAINAGE. In the north-eastern corner a section of the Laurentian Hills produces a broken and hilly country, somewhat higher than the surrounding region. The southern and central parts of the province are

nearly level and are a continuation of the broad valley of the Red River of the North, found in Minnesota and North Dakota. The western border of this valley is formed by an escarpment, which marks the shores of the ancient lake of which the valley was the bottom. West of this escarpment the surface consists of rolling or undulating prairie, which increases slightly in elevation toward the western boundary. The higher swells here are known as the Riding and Duck Mountains. In the northwestern corner these mountains are covered with heavy forests of pine.

The Red River of the North crosses the southern boundary a little east of the middle point and continues to Lake Winnipeg. Its chief tributary is the Assiniboine, which enters the province from the west. In the north-eastern part are found the Berens and the Pigeon rivers, while the northwestern section is drained by the Swan. All of these streams are small. Three large lakes occupy a portion of the north central part of the province. These are Lake Winnipeg, Lake Winnipegosis and Lake Manitoba. Of these, Lake Winnipeg is the largest, being 270 miles long and varying in width from 20 to 60 miles. All of these lakes are shallow and their shores are low.

CLIMATE. The climate is characterized by extremely cold winters, in which the thermometer may fall as low as 50° below zero, and short, hot summers; but the dryness of the atmosphere prevents these extremes from being felt to the extent that they would be in more humid regions. The rainfall averages about 17 inches, but three-fourths of this occurs during the growing season, so that, notwithstanding the limited annual precipitation, the country is well suited to agriculture.

MINERAL RESOURCES. Manitoba's most valuable mineral resource consists in her large areas of deep, rich soil. Some coal and lignite occur along the southern boundary and these are mined to a limited extent. There are also some deposits of iron ore, but they have never been worked.

AGRICULTURE. The great valley occupying the central portion of the province is well suited to the growing of all crops that can be raised in a cool temperate climate, but because of the peculiar nature of its soil, Manitoba is especially adapted to raising the best varieties of spring wheat, and this crop far outranks in acreage and amount all other cereals. Next in importance to wheat are oats, barley, flax and potatoes.

Hay and forage crops are grown to a considerable extent, and the raising of live stock and dairying are fast becoming important branches of agriculture.

OTHER INDUSTRIES. The lakes and streams abound in fish, and the taking and exporting of whitefish, sturgeon, pickerel and other fish is an important industry. There are but few manufactures, and these consist of such industries as meet the local demands of the population. No large establishments have yet located within the province, but there are numerous small mills for the manufacture of flour, and some lumber mills are engaged in supplying the inhabitants with lumber and timber products.

TRANSPORTATION. The Canadian Pacific railway crosses the province from east to west and has numerous branches extending in various directions from Winnipeg. A branch of the Northern Pacific railroad enters the province from Minnesota and extends to Winnipeg, thus forming connection with the trans-continental lines of the United States and with Saint Paul and Minneapolis. During high water the Red River and the Assiniboine are navigable, though since the construction of railways they are but little used. The Saskatchewan and its outlet, the Nelson, are navigable to Hudson Bay, and with the outlay of comparatively little expense an important ocean route could be developed along this system of rivers.

The commerce of the province consists of the exportation of wheat and other grains to England and the importing of manufactured goods and certain food products not profitably grown within the province.

CITIES. The population of Manitoba in 1901 was 255,211. The principal cities of the region were Winnipeg, the capital, with a population of 42,340; Brandon, with a population of 5380, and Portage la Prairie.

GOVERNMENT. The government consists of a lieutenant governor, appointed by the governor-general and council of Canada for a term of five years, and a legislature of one house of 40 members, elected for four years. The common law of England prevails in Manitoba, and English is the official language. The courts consist of a supreme court, with one chief justice and three associates, and inferior courts for each county. Local affairs are managed by counties and townships. Winnipeg is the capital.

EDUCATION. Manitoba maintains an excellent school system and was the first province to follow the example of the United States in setting

apart one section of land in each township for school purposes. The University of Manitoba, which is an examining and degree-conferring body, is at the head of the school system, and it has affiliated with it the various denominational colleges, as well as public schools. There is also a provincial normal school at Winnipeg.

HISTORY. The territory from which Manitoba was formed formerly belonged to the Hudson's Bay Company and was sold to Great Britain in 1869. It was transferred by that government to Canada, but previous to this the earl of Selkirk, a member of the Hudson's Bay Company, established a settlement on the Red River, a little north of the present city of Winnipeg. After the construction of the Canadian Pacific Railway, the province was rapidly settled, and the influx of English immigrants caused a local struggle between the English and French settlers, who, under the leadership of Louis Riel, imprisoned some of the English and Scotch settlers and then proceeded to establish a provisional government. On the arrival of Canadian troops, however, Riel and his followers immediately disappeared, and a permanent government was established. In 1885 another rebellion under the same leadership occurred, which caused more or less loss of life and property. Riel was finally captured and executed. The province was admitted to the confederation forming the Dominion of Canada, in 1870, and from that time it has had a steady growth in population and wealth.

Manitoba Lake, a lake of Canada, situated in the Province of Manitoba, s. w. of Lake Winnipeg, about 125 mi. in length by about 25 mi. in breadth and with an area of 1900 sq. mi. It receives the waters of several lakes at its northern extremity, and at its southern it receives those of White Mud River. It discharges into Lake Winnipeg through the Dauphin River.

Manitou, *man'i too*. See MANITO.

Manitou, COL., a town of El Paso co., 6 mi. n. w. of Colorado Springs, at the base of Pike's Peak, 6296 feet above the level of the sea. It is a famous health and pleasure resort and is noted for its mineral springs and its beautiful scenery. The place has many canyons and falls, and Monument Park and the Garden of the Gods are here. Population, in summer, over 5000; in 1903, 1303.

Manitoulin, *man i too'lin*, **Islands**, a group of islands in Lake Huron, consisting of Great Manitoulin, 80 mi. long by 5 to 30 mi. broad,

Little Manitoulin, and Drummond Island. The two former belong to Canada; Drummond belongs to the United States. Population, about 2000, more than one-half of whom are Indians.

Manitowoc', Wis., the county-seat of Manitowoc co., 75 mi. n. of Milwaukee, on Lake Michigan at the mouth of the Manitowoc River, and on the Wisconsin Central and the Chicago & Northwestern. It is connected by a boat line with the Pere Marquette railroad, in Michigan. The town has a good harbor and considerable lake commerce, shipping large quantities of grain, flour, dairy products and leather. The industrial establishments include, also, cigar factories, breweries, shipyards, planing mills, brickyards and machine shops. The city contains the James Library, the county insane asylum and a Polish orphanage. It was chartered as a city in 1870. Population in 1905, 12,733.

Manka'to, MINN., the county-seat of Blue Earth co., 90 mi. s. w. of Saint Paul, at the confluence of the Blue Earth and Minnesota rivers and on the Chicago Great Western, the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. It is situated in an agricultural region near valuable stone quarries. The principal manufactures are knit goods, cement, lime, beer, candy, butter, lumber, flour, and foundry and machine shop products. A state normal school is located here, and the city has a Carnegie library, two hospitals, a commercial college, good schools and about a score of churches. The place was settled in 1852, was incorporated six years later and was chartered as a city in 1868. Population in 1905, 10,996.

Mann, HORACE (1796-1859), a celebrated American educator, born at Franklin, Mass. During his boyhood and youth he worked on a farm and attended a country school. At the age of twenty he left the farm and began the study of Latin and Greek, after which he entered the Junior class of Brown University. After graduation he studied law and was admitted to the bar, but four years later he was elected to the Massachusetts legislature and was ultimately elected to the Senate. In 1837 Mann was appointed secretary of the Massachusetts board of education, which position he held for twelve years. He devoted his entire time to revising and reorganizing the common school system of the state. He published the *Common School Journal* and a series of annual reports, which exerted great influence toward securing the changes that he desired. In one of

these reports he compared the systems of instruction followed in Prussia with those in use in Massachusetts. During his term of office he secured the establishing of the Massachusetts state normal schools, the first in the United States, and completely reformed the public



HORACE MANN

school system. In 1848 he was elected to Congress to fill the vacancy caused by the death of John Quincy Adams. During his term he endeavored to have the government establish a national bureau of education at Washington, but this was not done until much later.

Man'na. When the Children of Israel were journeying in the desert, according to the account in *Exodus* xvi and *Numbers* xi, they were fed with a substance which fell from heaven and to which the name *manna* was given. It was small, round and white and had a sweet taste. Each person gathered in the morning enough to last him through the day and no longer, for if it was kept over from one day to the next, it spoiled. On the day before the Sabbath, however, a double portion fell, and on that day it could be kept. When the Israelites entered Canaan, the falling of the manna ceased.

Mannheim, *mahn'hime*, a town of Germany, in the grand duchy of Baden, on the right bank of the Rhine, near its junction with the Neckar. The grand-ducal palace, one of the largest

buildings of its kind in Germany, is the most interesting building, and it contains a fine picture gallery and a library. The town has an extensive harbor and docks and is the chief commercial town of the upper Rhine. Its industries include the manufacture of machinery, sugar, chemicals, cigars, varnish and leather. Population in 1900, 141,131.

Man'ning, HENRY EDWARD (1807-1892), a Roman Catholic prelate, born at Totteridge in Hertfordshire and educated at Harrow and at Balliol College, Oxford, and made a Fellow of Merton. He was a leader of the Tractarian party, but in 1851 left the Church of England and joined the Roman Catholic Church. After being ordained priest, he studied several years in Rome, founded the congregation of the Oblates of Saint Charles Borromeo at Bayswater, London, was made archbishop of Westminster in 1865 and cardinal in 1875. Manning worked for the advancement of the Church of England, for the improvement of the people in temperance and education and wrote many articles and pamphlets on the Vatican Council, infallibility and the temporal power of the pope. Before he joined the Catholic communion he published several volumes of sermons.

Man-of-War, a war vessel in the service of a government. A man-of-war is considered a floating piece of the territory of the nation whose flag it carries, and consequently under international law it has greater rights than the ships owned by private persons. See WAR SHIP; PRIVATEER.

Man-of-War Bird. See FRIGATE BIRD.

Manon, *ma nohN'*, JEANNE PHILIPON, MADAME. See ROLAND DE LA PLATIERE, MARIE.

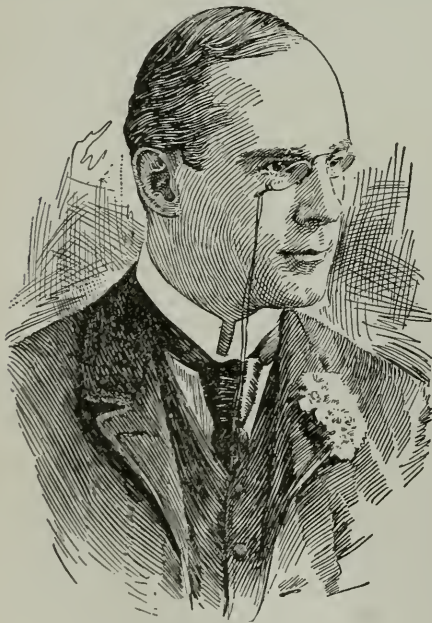
Mans, *mahN*, LE, a town of France, capital of the Department of Sarthe, on a height above the Sarthe River, 130 mi. s. w. of Paris. The principal building is a fine Gothic cathedral, supposed to be in part a product of the tenth century. The chief manufactures are woolen and linen goods, chemicals, lace, hosiery, tobacco and leather. Le Mans existed in the time of the Romans. It was the birthplace of Henry II, the first of the Plantagenet kings of England, and it witnessed the final dispersion of the Vendean army in 1793. It was the scene also of the defeat of the French army under Chanzy by the Germans under Prince Frederick Charles in January, 1871. Population in 1901, 63,272.

Man'sard Roof, a roof formed with a break in the slope, so that each side has two planes, the lower one approaching more nearly to the

perpendicular than the upper. This kind of roof permits of an upper story in place of an ordinary attic. It received its name from François Mansart, a famous French architect, who introduced it in France.

Mans'field, OHIO, the county-seat of Richland co., 80 mi. s. w. of Cleveland, on the Baltimore & Ohio, the Erie and the Pennsylvania railroads. The city is in an agricultural region, has a large trade and contains manufactures of thrashing machines, boilers, engines, pumps, street cars, electrical appliances and other articles. The important buildings include the Children's Home, a Y. M. C. A. and about twenty-five churches. The Ohio State Reformatory is located here, and the city has a public library, four banks and two business colleges. Mansfield was for many years the home of John Sherman. It was settled in 1808 and was first incorporated in 1828. Population in 1900, 17,640.

Mansfield, RICHARD (1857-1907), an American actor. He was born in Heligoland and



RICHARD MANSFIELD

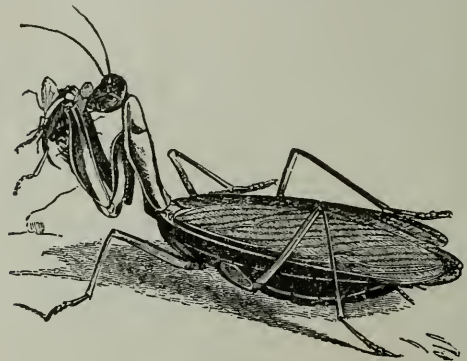
studied for East Indian civil service; but he came to Boston at the age of seventeen and opened an art studio. In 1875 he returned to England and went on the stage, playing at first small parts in comic opera, then in comedy and later in tragedy. He made his first great hit as Baron Cheverial in *A Parisian Romance*, at the

Union Square Theatre, New York, and from that time his reputation grew steadily. At the time of his death he was recognized as the foremost actor of America. Among his favorite parts were the title rôles in *Richard III*, *Cyrano de Bergerac*, *Dr. Jekyll and Mr. Hyde*, *Beau Brummel*, *Monsieur Beaucaire* and *Peer Gynt*.

Manslaughter, *man'slaw tur*. See MURDER.

Man'son, PATRICK (1844-), an English physician, noted for his studies into the cause and treatment of malaria and other tropical diseases. He was one of the first to suggest that the mosquito is active in the transmission of malaria.

Man'tis, a genus of insects, remarkable for their grotesque forms. They frequent trees and



PRAYING MANTIS

plants, and the forms and colors of their bodies and wings are so like the leaves and twigs as to be almost indistinguishable. The praying mantis has received its name because it holds its forelegs in the position of the hands of a person at prayer. In its habits, the mantis is voracious, killing insects and cutting them to pieces. It is a native chiefly of tropical regions, but one species is found in the United States.

Man'tua, a strongly fortified town of northern Italy, capital of the province of the same name, on the Mincio River, 22 mi. s. s. w. of Verona. There are several buildings of historic interest, among them the Palazzo Vecchio, in which Napoleon held his court; and there is a large public library, various museums and a botanic garden. The manufactures are limited, and the trade is chiefly in the hands of the Jews. Mantua is a very ancient city, having been founded, it is said, by the Etruscans before the building of Rome. The Gongazas governed it for about three centuries with great ability and distinguished themselves by the splendor of their court and their patronage of art and literature,



RICHARD MANSFIELD AS RICHARD III



but on the death of the last duke, in 1708, the duchy was made a part of Austria. Bonaparte captured the city in 1797, but Austria regained possession in 1814. It was united with Italy in 1866. Population in 1901, 29,142.

Man'ual Training, a department of education that systematically teaches the theory and use of tools, the nature of common materials, and the elementary processes in the more common industrial arts, such as carpentering, wood carving, forging and machine-shop practice. Sewing and cooking, as arts, are properly classed as manual training subjects and are taught in most manual training schools.

The first manual training school in the United States was opened in Saint Louis in 1880, under the direction of Doctor Calvin M. Woodward, as a department of Washington University. Such excellent results were obtained from this school that other large cities established similar schools, either as independent institutions or as departments in existing high schools.

The introduction of manual training into the elementary schools began in 1882, in the Dwight School of Boston. Progress, however, was slight. Many patrons were opposed to the work, because they believed that the time of a school should be devoted to the study of books; also, because of the extra expense for material and because teachers were not prepared to do the work. At first the work lacked system, and the results were very crude; but with the establishing of the Sloyd School of Boston, a way was prepared for the introduction of this system of construction work into the elementary schools. Wherever sloyd was introduced and taught by competent teachers, the results were so satisfactory as highly to recommend it. Modifications of the sloyd system and other systems have followed; and now manual training constitutes a regular feature of the system of instruction in every large city and in more than three-fourths of the cities of 8000 inhabitants in the United States, while a large number of cities below 8000 population have introduced it, either in the elementary schools or in the high school. In 1903 a movement was begun by the National Education Association for the introduction of manual training and elementary agriculture into the rural schools and the schools of small towns and villages. A committee was appointed to investigate the feasibility of such a movement and to prepare plans for carrying it out, provided the work was found feasible. This committee made its report in 1905 and recommended

the introduction of these lines of work into all rural high schools and into consolidated common schools in which there were several grades. The committee also recommended the establishment of secondary schools in rural communities, in which instruction in the elements of agriculture, manual training and domestic economy should be made leading features. The committee did not, however, see its way clear to recommend the general introduction of manual training into one-room schools, because of the lack of suitable apparatus, the crowded condition of programs in such schools and the inability of most teachers of rural schools to do the work.

The great majority of those who favored manual training at the time it was introduced into the public schools of the country advocated it for its utility value, claiming that it gave a training which prepared those taking it to enter upon some definite trade much more readily than would be possible without it. Many of those opposed to it based their opposition on the ground that it had little educational value and that it was no part of the business of the public school system to teach trades. At that time, few of the advocates of manual training saw the possibilities which have since been realized through its development, nor did they claim for it the cultural value which at the present time is generally conceded. Most educational men now concede its value for purposes of training and its right to a place in the public school system.

The change in attitude of those responsible for the introduction of manual training into the public schools is shown by the fact that in the earlier years of its history teachers were sought among artisans, while at the present time it is recognized that the same pedagogical principles apply in teaching manual training that apply in teaching other subjects and that, for the best results, teachers must have special professional training as a preparation for this work. This has led to the establishment of many training schools specially designed to prepare manual training teachers.

The weight of the best educational thought upon this subject is that manual training should be begun at the very beginning of the elementary school work and that it should be continued through the high school period; that the work should not be confined to a single material and the tools necessary in the treatment of that material, but that it should cover a wide range in the use of tools and materials.

The purposes of manual training are (1) to enable the child to enlarge his powers of expression, through the action of the hand, guided and controlled by the action of the mind; (2) to make him acquainted with the nature and use of the most common materials, such as clay, wood, iron and textiles; (3) to lead him to develop a certain degree of skill in the use of tools; (4) to develop his originality, and (5) to connect the work of the school with the affairs of everyday life. To these ends, in the elementary schools the work in drawing, modeling and nature study is all closely identified with manual training.

The work in manual training varies widely in different school systems, as might be expected in the early stages of its development; but the educational values of exercises with different tools and materials are being carefully studied, and this study is resulting in a more definite, rational and systematic organization year by year.

The early argument for manual training, that it has a distinct industrial value for those who may earn a living by their hands, is to-day questioned by few. More general knowledge as to the very large percentage of pupils whose formal education does not extend beyond the elementary schools, and who in later life must earn their living by the use of their hands, is indeed strengthening this argument. Educational men are no longer afraid to advocate the use of something in the public schools which will directly fit the child to earn a livelihood. It is coming to be recognized that the ability to support one's self and those dependent upon one is the first essential of good citizenship, and that therefore the work in public schools in training for citizenship cannot ignore this first essential.

It is not the idea of manual training to teach trades in the elementary schools, but that elementary school pupils should be given such systematic training of the hands, through the manipulation of a wide range of tools and materials, as will accustom them to deal with material things and will enable them, because of their training, to acquire a definite trade more readily and more promptly than they could without such training.

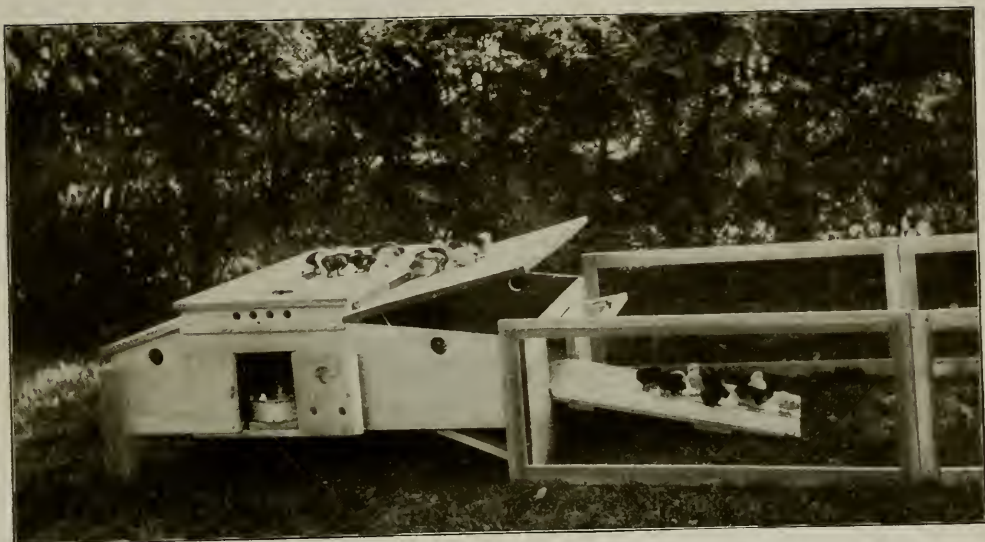
The argument for giving systematic manual training in the public schools because of its cultural value for all pupils, irrespective of what their employment may be after their school days are over, may be briefly stated as follows: The essence of all training is *doing*; the essential feature of manual training is doing with the

hands. In systematic manual training, from beginning to end, the motor activities of the hand must be set in operation and must be guided and controlled by the action of the mind. Mental power comes through organized thinking. Organized thinking follows whenever the individual sets himself a definite task to do and then determines and applies the ways and means necessary for the accomplishment of that task. Tools cannot be used successfully upon material to produce a desired result, without the exercise of the closest attention and of those forms of mental activity leading up to an act of judgment. There can be no training of the hand which does not involve mental activity, and the mental activity thus involved is of a kind that furnishes just the training needed for the practical concerns of life.

When properly taught, manual training is of great value, both from the practical and the cultural points of view. From the practical point of view it increases the pupil's power to do, gives him a degree of skill in the use of tools and teaches him the dignity of labor and the value of material. From the cultural point of view, it is of the highest value in the development of the individual, because, first, it demands concentration of attention and thus develops that quality so essential to success in any field of human endeavor; second, it requires organized thinking in the adaptation of means to ends, a demand which will be constant through life; third, it demands an exercise of the will power, resulting in doing for the realization of those ends, and through the doing there comes a clarification of the thinking.

The danger is that it may descend to a single variety of shop work or to training for a particular trade. These are far from the true ends of this system of instruction. It is not the article made, but the power which the pupil acquires in making it, that the practical teacher of manual training seeks; hence, finely finished products are not sought so much as are means of developing the pupil's originality in design and construction. In order that the true ends of manual training may be reached, only teachers who are thoroughly in sympathy with the work and who have received special training for teaching it, should be engaged as teachers of manual training. See DRAWING; NATURE STUDY; SLOYD; TECHNICAL EDUCATION.

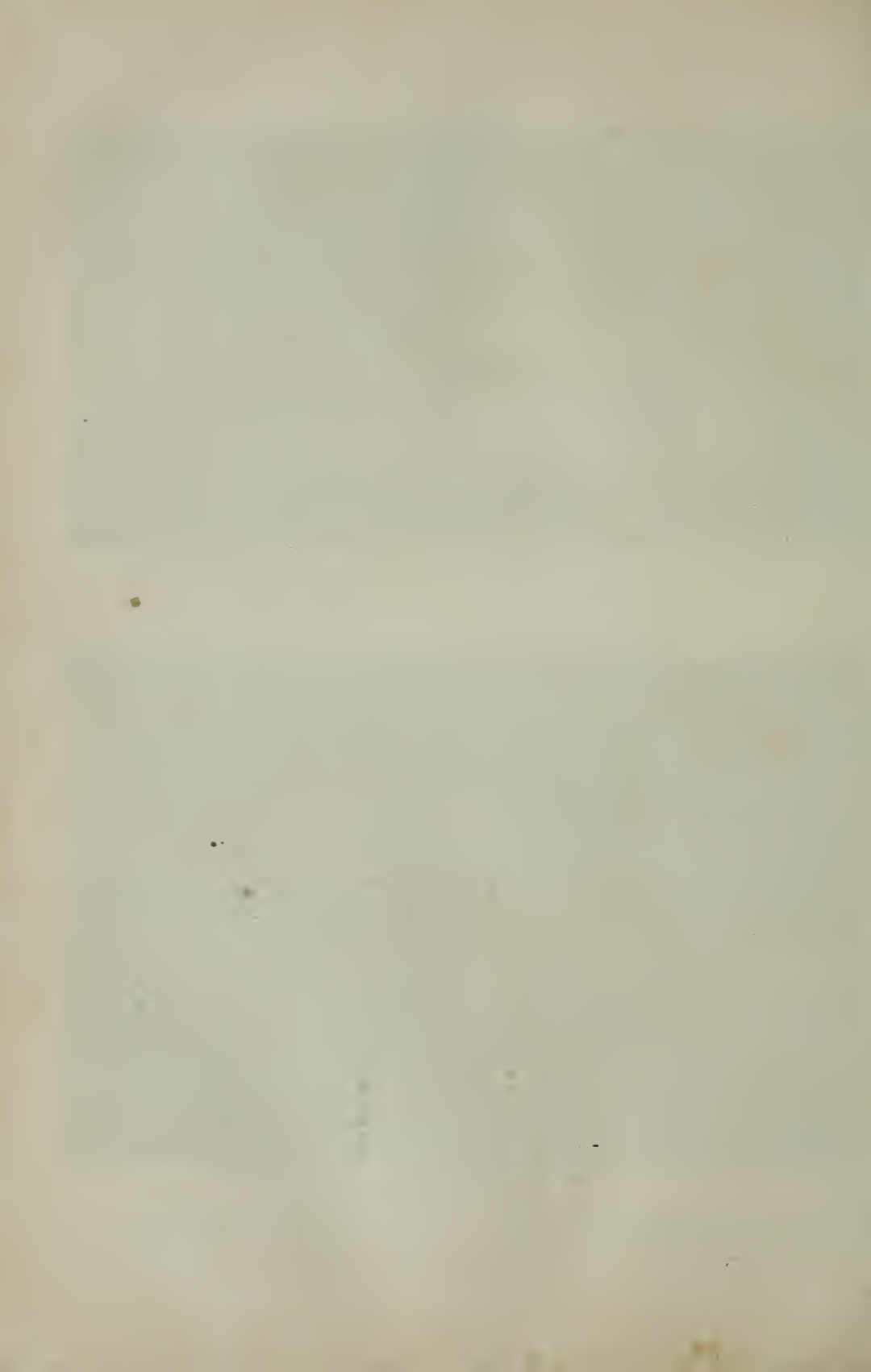
Consult Ware's *Educational Foundations of Trade and Industry*; Dewey's *The School and Society*; Booker T. Washington's *Working with*



MANUAL TRAINING

Brooder made by Children of Grammar Grades,
Platteville, Wisconsin

Shopwork,
Fostoria, Ohio



the Hands; Salomon's *Theory of Educational Sloyd*; Woodward's *Manual Training in Education*; Rouillion's *The Economics of Manual Training*, and the report of the National Education Association's committee on *Industrial Education for Rural Schools* (1905).

Manures', *ma nure'z*, substances applied to soil for the purpose of aiding in the production of crops. Manures are divided into natural manures and artificial manures, or commercial fertilizers. By natural manure is usually meant the excrements of farm animals, also called stable manures; but the term may also include green manures, which are growing crops plowed under for the purpose of adding to the organic matter of the soil. Phosphates, lime, saltpeter and a number of compounds of potash are also used, but these are usually called fertilizers. In this article the term *manure* is confined to natural or stable manures.

Plants obtain their food from the air and the soil, and the continued growing of crops tends to exhaust the substances in the soil which are the most important elements of plant food. These are nitrogen, potash and phosphoric acid. Manure is used to restore this loss. It does this directly and indirectly; directly, since it contains the substances needed and sets them free by decomposition; indirectly, since the manure by its decomposition causes such chemical changes in the soil as to liberate the plant-food already there, which the plant alone cannot obtain. Stable manures are injured by exposure to the air and rain and should be kept under cover. They are the most effective when rotted, unless the process is carried on in the open air, when much of the value is lost; therefore, if manure cannot be kept under cover it should be spread upon the land before rotting begins. Manure usually gives the best results when spread evenly over the surface and plowed under or harrowed in.

Stable manures are bulky and are at best three-fourths water. A ton of such manure contains less than forty pounds of plant-food; consequently, good fertilizing requires several tons to the acre. See FERTILIZERS; GUANO.

Man'uscripts, literary writings of any kind, whether on paper or any other material, in contradistinction to printed matter. Although properly including all writings on hard substances, such as stone or baked clay, the term as generally used means only those writings which are on parchment or on paper. The paper of the ancient manuscript is sometimes

Egyptian, prepared from the real papyrus shrub, sometimes cotton or silk paper, which was invented in the East early in the eighth century A. D. and continued in use until after the invention of linen paper. The most common ink is a black, made of lampblack or burned ivory or bone. Red ink of a dazzling beauty is also found in some ancient manuscripts. With this color were written the initial letters, the first lines and the titles, which were thence called *rubrics*. Blue, green and yellow inks were more rarely used. On rare occasions gold and silver were used, though from their cost they were oftenest confined to initial letters. For the forms in which these ancient manuscripts appear, see the article Book.

The most ancient manuscripts still preserved are those which have been found in Egyptian tombs. Some of them date from 2500 to 3000 B. C. Next to them in point of age are the Latin manuscripts found at Herculaneum. Numerous manuscripts of the Old and New Testaments of the second and third centuries exist; and among those of profane authors may be noted that of Vergil (fourth century), in the Laurentian Library at Florence; a Livy (fifth century), in the Imperial Library of Vienna and the *Jewish Antiquities* of Josephus, in the Ambrosian Library, Milan. See PALIMPSEST.

ILLUMINATED MANUSCRIPTS. The art of illuminating manuscripts dates from the remotest antiquity. The Egyptian papyri were ornamented with vignettes or miniatures attached to the chapters, either designed in black outlines or painted in primary colors. It is supposed that the Egyptians used gold and silver for decorating their manuscripts, but no trace of such work has been found. The oldest ornamented Greek and Roman manuscripts that have survived are the Dioscorides of Vienna and the Vergil of the Vatican, both of the fourth century. From the eighth to the eleventh century, initial letters were composed of figures of men, quadrupeds, fishes and birds, while the initials of the twelfth century were made up of masses of conventional foliage, interspersed with the animal figures of the preceding centuries. Continuous borders, with vignettes and tail-pieces, were also prevalent in later times, and some manuscripts are ornamented with very artistic designs. From the sixth century to the sixteenth, the art of illuminating manuscripts was much practiced in Europe, and the ornamentation was often very complex and very

brilliant. With the invention of printing the art became practically extinct.

Manytch', a river of southeastern Russia, which in its course connects a series of long, narrow salt lakes and joins the Don near Tcherkask. Some geographers consider this river valley the dividing line between Europe and Asia.

Manzanillo, *mahn sa nee'lyo*, a seaport on the southern coast of Cuba, in the Province of Santiago de Cuba. It has a good roadstead and its coastwise traffic is extensive. The region about it is low and unhealthful. Sugar, tobacco and lumber are the chief exports. Population in 1899, 14,464.

Manzoni, *man zo'ne*, ALESSANDRO (1785-1873), an Italian poet and novelist. His chief works are the *Sacred Hymns*; *The Fifth of May*, a powerful ode on the death of Napoleon; the tragedies *Carmagnola* and *Adelchi*, and his great novel *I Promessi Sposi* (The Betrothed).

Maoris, *mah'o rceez*, the native inhabitants of New Zealand. They belong to the Polynesian branch of the Maori race and are characterized by their large stature, being above the average, and by their excellent physical development. Tattooing is common among them, and they are also noted for their ornamental and decorative art. Formerly they were among the fiercest cannibals of the South Pacific, but after they were conquered by the British they rapidly adapted themselves to the customs of civilization and are now an intelligent and industrious people.

Map, a projection on a plane surface, representing the whole or part of the earth's surface. Since the earth is a spheroid, its surface cannot be accurately represented on a plane; hence in the drawing of maps systems of outlining, known as projections, have to be used. There are two such systems in general use. One is known as the *polyconic projection*, which is designed from rolling a cone, on which several lines parallel to the base and several perpendicular to the base are drawn, over a plane surface. When the lines parallel to the base are projected on the plane surface by the revolutions of the cone, they form circles, one within the other, and these constitute the meridians of latitude; the lines representing parallels of longitude are straight and radiate from the center. In some form or other this projection is the one most generally used in drawing maps of hemispheres, continents and large countries. It preserves the form of the land masses more accurately than

the other projection, known as *Mercator's*, in which the parallels and meridians are straight lines crossing each other at right angles. The Mercator projection is used for navigators' charts and for drawing certain maps of the world, used to represent commercial routes and the ocean cable lines. It is more simple than the other, and maps are more easily constructed upon it, but the land masses are drawn out of proportion, being too long from east to west as they approach the poles.

Navigators' maps are usually called charts, as are many maps of small areas drawn to show details, though in reality there is but little difference between a map and a chart. All maps are drawn by scale. In the United States the measurement used is inches. In European countries the metric system is generally employed. In drawing a map to a scale, a certain distance, as one inch, represents a certain distance on the surface of the earth, as one hundred miles. Relief maps are made by drawing and coloring, so as to show mountains and valleys, or by modeling, that is, using some material, such as plaster of Paris, putty or papier maché, and constructing maps with the actual elevations, though on such maps the scale of altitudes is much larger than the horizontal scale.

Ma'ple, a name for a family of trees peculiar to the northern and temperate parts of the globe. About fifty species are known, distributed through Europe, North America and different parts of Asia. The maples are characterized by their opposite branches, palmate leaves, with from three to seven lobes, by their full, symmetrical tops, when growing in the open country, by their gray bark and by their hard, fine-grained wood, which is white, or in the older trees, slightly rose-tinted. The *sugar*, or *rock*, maple is the most important species; this yields maple sugar, which in Vermont, northern New York and some parts of Canada, is an important article of manufacture. A tree of ordinary size will yield from fifteen to thirty gallons of sap yearly, from which are made from four to seven pounds of sugar (See SUGAR). The knotted parts of the sugar-maple furnish the pretty *bird's-eye*, or *curled*, maple of cabinet-makers. Some other American species are the *white maple*; the *red*, or *swamp, maple*; the *striped maple*, or *moosewood*; the *mountain maple*, the *vine maple* and the *large-leaved maple*. Two species are common in Great Britain, the *great maple*, often miscalled sycamore, and the *common maple*. The wood of

the former is valuable for various purposes, as for carving, turnery, musical instruments and wooden dishes. Another well-known species is the *Norway maple*, often planted in Great Britain as an ornamental tree.

Marabou, *mar a boo'*, a large stork, related to the adjutant bird and inhabiting Africa. It has beautiful, long feathers, which have been much sought for ornaments on ladies' hats. In their wild state the birds live in flocks near rivers. They are easily tamed, though their vigorous appetite makes them destructive to small domestic animals.

Marabouts, *mar a boots'*, among the Berbers of northern Africa, saints or sorcerers, who are held in high estimation and who exercise in some villages a despotic authority. They distribute amulets, affect to work miracles and are thought to exercise the gift of prophecy.

Maracaibo, *mah ra ki'bo*, a seaport of Venezuela, on the west shore of the strait which unites the lake and gulf of the same name. There is a good trade in coffee, cacao, timber, hides and medicinal plants. Population in 1905, about 50,000.

Maracaibo, LAKE, a lake of Venezuela, connected with the Gulf of Venezuela by a channel nine miles wide. The lake is deep, but it cannot be entered by large vessels on account of the bar at its entrance. The waters are generally fresh.

Marajo, *mah ra zho'*, or **Joannes**, an island of Brazil, between the estuaries of the Amazon and Para rivers, belonging to the Province of Para. Its length is about 180 miles, its width, 150 miles, but the population is scanty and consists largely in transient dwellers, who come to the island to hunt or to gather rubber.

Maranhao, *mah ra nyown'*, or **Sao Luiz**, a city of Brazil, capital of the State of Maranhao, situated on the island of Maranhao, opposite the mouth of the Itapicuru. The harbor, which was originally good and permitted the entrance of fairly large vessels, is gradually being filled up with sand, and the trade is consequently declining. The town is regularly laid out and has some interesting buildings, the most noteworthy of which are the cathedral, the episcopal palace, the government buildings and the town house. Population, about 40,000.

Marat, *ma rah'*, JEAN PAUL (1744-1793), one of the most famous leaders of the French Revolution. He studied medicine at Paris and spent many years in travel, visiting London, Edinburgh, Dublin and Amsterdam. The out-

break of the revolution brought him to the front, and he became the editor of the *L'Ami du Peuple*, or *Journal de la République Française*. This was the organ of the radicals and soon became the oracle of the mob. It early advocated the most extreme measures, and the tone became more furious as Marat was inflamed by the prosecutions of the authorities. In 1792 he took his seat at the Commune and played a leading part in the assassinations of September, 1792. He was a member of the Committee of Public Safety and of the Convention. The establishment of the revolutionary tribunal and of the committee for arresting the suspected was on his motions. As president of the Jacobin club, he signed an address instigating the people to an insurrection and to the massacre of all traitors. For this Marat was delivered over to the revolutionary tribunal, which acquitted him; and the people received him in triumph and covered him with wreaths. He was assassinated shortly after by Charlotte Corday (See CORDAY D'ARMONT, MARIE ANNE CHARLOTTE).

Mar'athon, a village of ancient Greece, in Attica, about 20 mi. n. e. of Athens. It was situated on a plain which extends for about six miles along the seashore, and it was on this plain that Miltiades, the Athenian general, defeated Darius with his Persian forces in 490 B. C. It has been called one of the "fifteen decisive battles of the world" (See FIFTEEN DECISIVE BATTLES).

Marble, *mahr'b'l*, a crystallized limestone, usually finer grained and harder than the common limestone and capable of receiving a high polish. The crystals are small, but are easily seen by the use of a magnifying glass on a piece of the polished stone. Pure marble is perfectly white, but there are many varieties and colors, owing to the different impurities in the rock. This, however, is an advantage, since the different varieties are suited to many different purposes. Some varieties are also harder and stronger than others, and some will withstand the water better than others. All these varieties are grouped under five classes: (1) pure or single-colored marbles; (2) variegated; (3) brecciated, that is, made of other rocks cemented by limestone; (4) fossiliferous, made wholly or in part of fossils; (5) serpentine, or *verde antique*. Marble is found in a number of localities, but the quarries most widely known are those in Italy, on some islands of the Mediterranean Sea and in the United States. Of the foreign quarries those at Carrara, yielding the cele-

brated Carrara marble, are at present the most widely known. In the United States the most extensive quarries are found in Rutland County, in the southwestern part of Vermont. Other important quarries occur in Georgia and in Tennessee, while very recently valuable quarries have been opened in Alaska.

In the American quarries and marble works most of the work is done by machinery, and there is very little waste, but in the foreign countries the old methods of blasting the rock and cutting by hand are still in vogue. This involves much waste and requires a long time for cutting the stone from its bed. Marble is extensively used for headstones, monuments and for finishing the interiors of buildings.

Marblehead, MASS., a town in Essex co., 18 mi. n. e. of Boston, on a rocky peninsula of Massachusetts Bay and on the Boston & Maine railroad. It was settled by immigrants from Guernsey and Jersey in 1629 and remained for twenty years a part of Salem. Many buildings constructed before the Revolution are still standing in a good state of preservation. The town has a good harbor and was for a time during the early days a settlement second only to Boston. Fishing is yet an important industry, while boat building and the manufacture of shoes are also carried on. The place has become a popular yachting and summer resort. Population in 1905, including several villages, 7209.

Marbles, like tops and balls, have been the playthings of children from time immemorial. The variety of games played with marbles is almost endless and every locality has its own favorite games. In the United States the snow is no sooner off the ground in the northern villages than every boy brings out his marbles and plays vigorously with them for a few weeks, when they disappear suddenly and completely for another year, usually giving way to the more exciting sport of baseball. Most of the common marbles now come from Coburg, in Saxony, where the hard limestone is found. This stone is broken into small cubes, and several hundred of these cubes are placed in grooves cut around a stationary millstone. Revolving on this millstone is a block of oak, which smooths the cubes into rough spheres while water runs over them. Later the marbles are polished in revolving barrels, lined with stone. Three mills, it is said, will manufacture 60,000 marbles in a week. Agate marbles are made at Oberstein by pressing the hot glass into metal molds. The

bull's-eye and striped marbles are molded in clay, then baked, painted and glazed.

Marbury versus Mad'ison, a famous case in the Supreme Court of the United States in 1803, in which for the first time the Supreme Court stated its right to declare a Congressional law null and void because contrary to the Constitution. The case arose over an attempt of Marbury to compel James Madison, in accordance with an act of Congress, to deliver to him a commission as justice of the peace in the District of Columbia. Since the Constitution does not give the Supreme Court original jurisdiction in such cases, the law was clearly unconstitutional and was so declared. Chief Justice Marshall, who delivered the opinion, also stated directly that the Constitution must be supreme over any statute, a rule which was immediately accepted and which constitutes one important peculiarity of the American system of government.

Marcellus, *mahr sel'lus*, MARCUS CLAUDIUS, a Roman general, five times consul. He was the first Roman who successfully encountered Hannibal in the second Punic War, and he was the conqueror of Syracuse (212 B. C.). He was killed in a skirmish with the Carthaginians in 208 B. C. On account of his daring and impetuosity Marcellus was called the *Sword of Rome*.

March, originally the first month of the Roman year. Till the adoption of the new style in Britain (1752), the 25th of March was the first day of the legal year; hence January, February and the first twenty-four days of March have frequently two years appended, as Jan. 1, 170½, or 1701-2.

Marco'ni, GUGLIELMO (1875-), a celebrated Italian electrician, born near Bologna, Italy, and educated at the University of Bologna. Marconi showed remarkable aptitude for electrical science at an early age. After many experiments he was successful in perfecting instruments which made wireless telegraphy practicable, and to him is due the credit of this invention. Marconi's first wireless telegraph station was established near Cornwall, England. He demonstrated the success of his invention by sending signals across the Atlantic between the United States and European countries, and his system is in quite general use for commercial and naval purposes (See TELEGRAPH, WIRELESS). (See portrait on next page.)

Marco Po'lo. See POLO, MARCO.

Mar'cus Aure'lius. See AURELIUS, MARCUS.

Marcy, *mahr'sy*, WILLIAM LEARNED (1786-1857), an American statesman, born at Southbridge, Mass., educated at Brown University and admitted to the bar. He began the practice of law at Troy, N. Y., but enlisted in the War of 1812, becoming captain in the army but retiring from the service before the close of the war. In 1831 he was chosen United States senator, and in the following year he became governor. During his brief service in the Senate, he was a staunch follower of Andrew Jackson, and was the first to declare the propriety of the rule that



GUGLIELMO MARCONI

“to the victors belong the spoils of the vanquished.” He served three terms as governor of New York, became secretary of war in 1845 and under Pierce was secretary of state. In this capacity he settled the Mexican boundary controversy, a fisheries dispute with Great Britain, a reciprocity treaty with Canada, and dispatched Commodore Perry’s expedition to Japan. In all, he displayed notable ability as statesman and diplomat.

Mardi Gras, *mahr'de grah'*. See SHROVE TUESDAY.

Marechal Niel. See MARSHALL NIEL.

Mare Island, an island in San Pablo Bay, near San Francisco, of importance because it is the site of the chief United States naval station on the Pacific. It has a large navy yard, an arsenal, a dry dock and an observatory.

Maren'go, BATTLE OF, a famous battle fought near Alessandria, Italy, June 14, 1800, between the French, under Bonaparte, and the Austrians, under General Melas. The Austrians were completely defeated and were obliged to surrender Genoa, Piedmont and Milan. Napoleon’s supremacy was firmly established by this victory.

Margaret (1353-1412), queen of Denmark, Norway and Sweden, the daughter of Valdemar IV, king of Denmark. She was married to Haakon, king of Norway. The death of her husband in 1380 placed Norway in her hands; that of her son Olaf in 1387 enabled her to secure the throne of Denmark, to which she had previously brought about his election, and after defeating Albert, the Swedish king, she also obtained possession of the throne of Sweden. She endeavored to place the union of the three kingdoms on a permanent basis by an act of union. Her ability and strength won her the name of the *Semiramis of the North*.

Margaret of Anjou (1430-1482), daughter of René, titular king of Naples, married in 1443 to Henry VI of England. The king’s attacks of insanity made her practically regent, and her power being contested by the duke of York, a claimant of the throne by an elder line, the protracted Wars of the Roses commenced (See ROSES, WARS OF THE). After a long struggle the wars ended in 1471; she was made prisoner and remained in prison four years. She was ransomed by Louis XI of France.

Margaret of Navarre (1492-1549), a sister of Francis I of France, married in 1509 to the duke d’Alençon and eighteen years later to Henri d’Albret, later king of Navarre. Through her daughter, Margaret became the grandmother of Henry IV of France. She was among the foremost literary personages of her time, published dramatic and religious poems and letters and was probably in part the author of the famous *Heptameron*, modeled on the *Decameron* of Boccaccio. She was favorable to Protestantism, not so much because she believed in its doctrines as because she approved of absolute religious liberty.

Margarita, *mahr ga re'tah*, an island belonging to Venezuela, in the Caribbean Sea. Its greatest length is 45 miles, and its greatest breadth is about 20 miles. On the fertile land in the center of the island are produced maize, coffee, cotton and sugar. Pearls were formerly secured off the coast of this island. Margarita was discovered by Columbus in 1498. Population, about 40,000.

Maria Christina, *kris te'nah*, (1806–1878), queen of Spain, daughter of Francis I of the Two Sicilies. She was the fourth wife of Ferdinand VII of Spain and bore to him in 1830 a daughter, Isabella, who, in virtue of a proclamation issued before her birth, became heir to the kingdom. When Ferdinand died, Maria Christina was made the guardian of the young queen, but when civil war broke out on account of the pretensions of Ferdinand's brother, Don Carlos, to the throne, Maria Christina took little interest in the affair. Her entire attention seemed to center in one of her royal bodyguard, whom in 1833 she married. She became exceedingly unpopular, and in 1840 she was obliged to escape to France. In 1843 she returned to Spain, but eleven years later she was driven from the country. In 1864 she again returned, but was again driven into exile.

Maria Louisa, *loo ee'zah*, (1791–1847), second wife of Napoleon I, daughter of Francis I of Austria. Her marriage with Napoleon took place in 1810, after the divorce of Josephine, and in 1811 she bore him a son. After his overthrow, she received in 1816 the duchies of Parma, Piacenza and Guastalla, which she governed till her death.

Mariana, *mah re ah'na*, **Islands**. See LADRONE ISLANDS.

Maria Theresa, *te re'sah*, (1717–1780), queen of Hungary and Bohemia, archduchess of Austria and wife of the emperor Francis I. On the death of her father, Charles VI, in 1740, she ascended the throne of Hungary, Bohemia and Austria, and a little later she declared her husband joint ruler. Her accession was in accordance with the Pragmatic Sanction, to which her father had secured the consent of the powers of Europe, but her claims were at once contested. Frederick the Great made himself master of Silesia; Spain and Naples gained possession of the Austrian territory in Italy, and the French, Bavarians and Saxons marched into Bohemia, carrying all before them. Charles Albert was proclaimed archduke of Austria and shortly after emperor of Germany; the young queen fled to Pressburg, where she convoked the diet and threw herself upon the sympathy of her Hungarian subjects. The French and Bavarians were speedily driven from her hereditary states; Prussia made a secret peace with the queen, who unwillingly abandoned Silesia to Frederick, and by the Treaty of Aix-la-Chapelle (1748) her husband was declared emperor. During the time of peace which followed, Maria Theresa,

with the aid of her husband and her minister Kaunitz, made great financial reforms; agriculture, manufactures and commerce flourished, the national revenue greatly increased and the burdens were diminished. The Seven Years' War again reduced Austria to a state of great exhaustion, but on its conclusion the empress renewed her efforts to promote the prosperity of her dominions. Her son Joseph was elected king of the Romans in 1764, and on the death of her husband, in 1765, she associated the young prince with herself in the government. In 1772 she joined in the dismemberment of Poland, obtaining Galicia for Austria, and in 1777 she acquired Bukowina from Turkey. Of her sixteen children ten survived her, one of whom was the unfortunate Marie Antoinette.

Marie Antoinette, *ma ree' ahN'twah ne'*, (1755–1793), archduchess of Austria and queen of France, the youngest daughter of the emperor Francis I and Maria Theresa, born at Vienna. She was married at the age of fifteen to the Dauphin, afterward Louis XVI, but her manners were ill-suited to the French court, and she made many enemies among the highest families by her contempt for its ceremonies. The freedom of her manners, indeed, even after she became queen, was a cause of scandal. The extraordinary affair of the diamond necklace, in which the Cardinal Louis de Rohan, the great quack Cagliostro and a certain Countess de Lamotte were the chief actors, tarnished her name and added force to the calumnies against her. Without doubt, she had great influence over the king, and she constantly opposed all measures of reform. The enthusiastic reception given her at the guard's ball at Versailles on October 1, 1789, raised the general indignation to the highest pitch, and was followed in a few days by the insurrection of women and the attack on Versailles. When practically prisoners in the Tuileries it was she who advised the flight of the royal family in June, 1791, which ended in their capture and return.

On August 10, 1792, she heard her husband's deposition pronounced by the Legislative Assembly and accompanied him to the prison in the Temple, where she displayed the magnanimity of a heroine and the patient endurance of a martyr. In January, 1793, she parted with her husband, who had been condemned by the Convention; in August she was removed to the Conciergerie, and in October she was charged before the revolutionary tribunal with having dissipated the finances, exhausted the treasury,

Marietta

corresponded with the foreign enemies of France and favored the domestic foes of the country. She defended herself with firmness, decision and indignation; and she heard the sentence of death pronounced with perfect calmness—a calmness which did not forsake her when the sentence was carried out the following morning. There has been endless controversy as to the character of Marie Antoinette, and it seems certain that the bitter statements of her detractors are no more to be received absolutely than are the eulogies of those who regard her as a martyr and saint.

Ma'riet'ta, OHIO, the county-seat of Washington co., 125 mi. s. e. of Columbus, on the Ohio River, at the mouth of the Muskingum, and on the Baltimore & Ohio, the Pennsylvania and other railroads. It is the oldest settlement in Ohio, having been founded by Rufus Putnam and a colony from New England under the Ohio Company in 1788. The same year, the government of the Northwest Territory was formally organized here by Governor Arthur Saint Clair. The city is the seat of Marietta College and has a large public library, and, also, the oldest church and the oldest building in the Northwest Territory. Petroleum, coal and iron are found in the vicinity, and there is a large river trade. The manufactures include flour, lumber products, furniture, wagons, harness, glass and other articles. Just twelve miles below the city is Blennerhasset Island, which was the scene of some of the incidents connected with the conspiracy of Aaron Burr (See BURR, AARON). Population in 1900, 13,348.

Mar'igold, a name of several composite plants. The common marigold is a native of France and of the more southern parts of Europe. It is an annual, from one to two feet high, bearing large, deep yellow flowers. It is as prolific as any weed and was formerly used in cookery and as a medicine. A number of species of this genus are indigenous to the Cape of Good Hope. The so-called African marigold and French marigold, common in flower borders, are both Mexican species and have brilliant flowers. The name *marigold* is applied wrongfully to several plants. The English marigold is really a chrysanthemum, and the American marsh marigold belongs to the buttercup family.

Marine Corps, *ma reen' kore'*, a body of soldiers who serve in the navy of the United States. Originally the sailors sailed the ship, and the fighting was left largely to the soldiers

Mario

who were carried for that particular purpose; to some extent the same custom now prevails, but in a modern warship only about one-seventh are marines. In battle they man the fighting tops and are always used to make up landing parties. They are organized in the same way as the army, and when ashore they garrison the naval stations.

Marine Insurance. See INSURANCE.

Mar'inette', WIS., the county-seat of Marinette co., on Green Bay, at the mouth of the Menominee River opposite Menominee, Mich.,



MARIGOLDS

about 50 mi. n. of the city of Green Bay, on the Wisconsin & Michigan, the Chicago, Milwaukee & Saint Paul and the Chicago & Northwestern railroads. The city has a fine harbor and a large lake trade, especially in lumber. It contains large box factories and manufactories of various other wood products, thrashing machines, engines and other articles. The chief structures are the city and county buildings, two hospitals and a public library. Marinette was settled about 1850 and was incorporated in 1887. Population in 1905, 15,354.

Mario, *mah're o*, GIUSEPPE, Marquis di Candia (1808–1883), a famous Italian tenor,

born at Turin. He entered the Sardinian army in 1830, but deserted and fled to Paris. There, in 1838, under the assumed name of Mario, he became first tenor of the opera. For many years thereafter he divided his time between London, Paris and Saint Petersburg and made two tours of the United States, upon both of which he was received with warm approval.

Marion, IND., the county-seat of Grant co., 65 mi. n. e. of Indianapolis, on the Mississinewa River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Toledo, Saint Louis & Western and other railroads. There are also electric lines to Indianapolis and other cities. A national soldiers' home is just three miles to the south, and the city contains a public library, a fine courthouse and a large normal school. The principal industrial establishments are clock factories, flour, oil and paper mills, foundries and brickyards. Population in 1900, 17,337.

Marion, OHIO, the county-seat of Marion co., 45 mi. n. of Columbus, on the Cleveland, Cincinnati, Chicago & Saint Louis, the Erie, the Pennsylvania and other railroads. The city is in a farming region, has lime kilns and quarries and contains manufactories of steam shovels, engines, thrashers, buggies, carriages, foundry products, agricultural implements and other articles. It has a public library, Sawyer Sanitarium, a normal school, a Y. M. C. A. building and more than a dozen churches. The place was settled chiefly by people from Rhode Island in 1815 and was chartered as a city in 1890. Population in 1900, 11,862.

Marion, FRANCIS (1732-1795), an American Revolutionary commander. He entered the service as a captain, but was rapidly promoted until he became brigadier general. In 1775 he served in a regiment organized by Colonel William Moultrie in his native state of South Carolina, and he accompanied Moultrie on his occupation of Fort Sullivan. Later he commanded Fort Moultrie, took part in the attack on Savannah and then retired to South Carolina. With a cavalry force which he himself had organized in South Carolina, he kept up a guerrilla warfare on the British, and in August, 1780, he won a brilliant victory at Nelson's Ferry. At the Battle of Eutaw Springs he distinguished himself by his daring. After the close of the war he was for some time a member of the state senate and served in the constitutional convention in 1790.

Ma'rius, CAIUS (about 156-86 B. C.), a Roman general, born of obscure parents. He served

with distinction at Numantia in 134 B. C., under Scipio Africanus, was tribune of the people in 119 and acquired much popularity by his opposition to the nobles. In 115 B. C. he was appointed praetor, and a year later he became proprætor of Spain, which he cleared of robbers. In 109 he accompanied the consul Q. Cæcilius Metellus, as his lieutenant, to the Jugurthine War, and later he himself was placed in command of the war, which he brought to a successful conclusion. He had been elected consul in 107, and his successes against the barbarians who threatened Rome made him so popular that he was six times reelected to that office. On the outbreak of the war against Mithridates, Marius, who had long been jealous of Sulla, endeavored to deprive him of his command, and in the struggle which followed the former was compelled to flee from Italy. After hairbreadth escapes he landed in Africa and remained there until recalled by Cinna, who had headed a successful movement in his favor. In company with Cinna he marched against Rome, which was obliged to yield, the entry of Marius and his followers being attended with the massacre of most of his chief opponents. On the completion of the term of Cinna's consulship, he declared himself and Marius consuls, 86 B. C., but the latter died seventeen days later.

Mar'joram, a shrub, growing among copse-wood in limy soils of Great Britain, now naturalized in parts of the United States. The leaves are small and pointed; the flowers are reddish and grow in clustered spikes. Sweet marjoram is a biennial, cultivated in gardens. As soon as it blossoms it is cut and dried and is employed as a seasoning.

Mark, a term originally used in Europe, especially Germany and Spain, to designate eight ounces of silver or gold. It is now used commonly as a money of account and since 1873 has been the official monetary unit of the German Empire. It weighs .3982 grams, $\frac{1}{16}$ pure gold, and it is worth about 24 cents in United States money. It is equivalent to $\frac{1}{3}$ of a *thaler* or 100 *pfennige*. Coins in multiples of the unit and of these divisions are issued, also crowns (10 *marks*) and double crowns (20 *marks*). The same name is given to the monetary unit of Finland, which is exactly equal to one French *franc* and is divided into 100 *penni*.

Mark, SAINT, the Evangelist, according to the old ecclesiastical writers, the person known in the *Acts of the Apostles* as "John, whose sur-

Mark Antony

name was Mark" (*Acts* XII, 12, 25), was for many years the companion of Paul and Peter on their journeys. His mother, Mary, was generally in the train of Jesus, and Mark was himself present at a part of the events which he relates in his Gospel and received his information partly from eye-witnesses. He was the cousin of Barnabas (*Col.* iv, 10), and he accompanied Paul and Barnabas to Antioch, Cyprus and Perga in Pamphylia. He returned to Jerusalem, whence he afterward went to Cyprus, and thence to Rome. He was the cause of the memorable "sharp contention" between Paul and Barnabas. The time and place of his death are unknown.

Mark An'tony. See ANTONY, MARK.

Mark'ham, EDWIN (1852-), an American poet and educator, born in Oregon City, Ore. He spent his boyhood on a cattle ranch in California, attending country schools whenever he could. In 1871 he entered the San José state normal, and later he graduated from the Christian College, Santa Rosa. He became a prominent California educator and rendered especially valuable service as head master of the Tompkins Observation School at Oakland. From an early age he contributed poems to magazines, but came into prominence at the publication of *The Man with the Hoe* in 1899. Afterward, he lectured widely on existing social problems and wrote numerous articles on the same subjects.

Mark Twain. See CLEMENS, SAMUEL LANGHORNE.

Marl, an earthy substance, essentially composed of carbonate of lime and clay in various proportions. In some marls the proportion of clay is comparatively small, while in others it abounds and furnishes the chief qualities. The most general use of marl is to improve soils. The fertility of any soil depends in a great degree on the suitable proportion of the earths which it contains; and whether a lime or a clay marl will be more suitable to a given soil may be determined with much probability by its tenacity or looseness, moisture or dryness. The quicker action and greater efficiency of slaked lime have in many districts led to its substitution for marl. See FERTILIZERS; SOIL.

Marlboro, *mahr' bur o*, MASS., a city in Middlesex co., 25 mi. w. of Boston, on the New York, New Haven & Hartford and the Boston & Maine railroads. It was settled in 1646 and was incorporated four years later. In

Marlborough

1676, during King Philip's War, a large part of the town was destroyed by the Indians. The important structures are the high school, the city hall, Saint Anne's Convent and Academy and the G. A. R. building. The various manufactures include boots and shoes, machinery, automobiles, bicycles, wagons, electrical supplies, lamps and cigars. Population in 1905, including several villages, 14,073.

Marlborough, JOHN CHURCHILL, First Duke of (1650-1722), an English general and statesman, born at Ashe, in Devonshire. He early entered the army, served on the Continent under Turenne and at the siege of Maestricht distinguished himself so highly as to obtain the public thanks of the king of France. On his return to England he was made lieutenant colonel, and his advancement thereafter was rapid. He strengthened his influence at court, too, by his marriage with Sarah Jennings, an attendant upon the princess, afterward Queen Anne. When William III came to the throne of England, Churchill went over to his side, but in 1691 he was suddenly dismissed from all his employments and committed to the Tower on the charge of treasonable communication with the exiled James II. He soon obtained his release, though it appears that the suspicions against him were not without foundation. When the War of the Spanish Succession broke out, Churchill was made by William commander in chief of the English forces in Holland.

Anne came to the throne in 1702, and through his wife Churchill's influence soon became paramount. In the campaign of 1702 he drove the French out of Spanish Guelders and took Liège and other towns, for which he was created duke of Marlborough. In 1704 he stormed the French and Bavarian lines at Donauwörth, and in the same year, in conjunction with Prince Eugene, he gained the victory of Blenheim over the French and Bavarians. Many honors and gifts were awarded Marlborough for this victory. The years that followed were marked by the brilliant victories at Ramillies and Oudenarde, both won in conjunction with Prince Eugene. In 1709 he won a victory at Malplaquet, but he had lost his popularity. On his next visit to England he found that the duchess, by her arrogance, had so disgusted the queen that a total breach had ensued. On the accession of George I, Marlborough was reinstated in the supreme military command. Throughout the rest of his life, however, he lived in retirement.

Marlowe, *mahr' lo*, CHRISTOPHER (1564-1593), an English dramatist. He settled in London and became an actor, as well as a writer for the stage. His death occurred in a drunken brawl. Besides six tragedies of his own composition, the best known of which are *Tamburlaine the Great*, *Edward II*, *Doctor Faustus* and the *Jew of Malta*, he wrote parts of dramas, collaborating with Nash and perhaps with Shakespeare. Marlowe was by far the greatest dramatic writer before Shakespeare.

Marlowe, JULIA (Mrs. Julia Marlowe Tabor) (1870-), an American actress, born in Cum-



JULIA MARLOWE

berlandshire, England: When she was five years of age her parents removed to the United States, where she afterward resided. She was educated in the public schools and began her career on the stage in her twelfth year, when she joined a juvenile opera company and took part in *Pinafore*, *The Chimes of Normandy* and other light operas. She was christened Sarah Frances Frost, but was known as Frances Brough during her connection with the juvenile company. She later played a child's part in *Rip Van Winkle*, and the next year she took small parts in classic dramas in the Western states. She then retired from the stage and studied for three years in New York. On reëntering theatrical life Miss Marlowe made her début as Parthenia in *Ingomar*. After 1888 she starred in Shakespearean and other rôles and

was most successful as Viola in *Twelfth Night*, Rosalind in *As You Like It* and Juliet in *Romeo and Juliet*. She married Mr. Robert Tabor, for several seasons the leading man in her company, but she was divorced a short time later.

Marmora, *mahr'mo ra*, or **Marmara**, SEA OF (ancient Propontis), an inland sea, lying between European and Asiatic Turkey, communicating with the Mediterranean by the Dardanelles and with the Black Sea by the Bosphorus. Its greatest length is about 160 miles, its greatest breadth, about 50 miles. It contains several islands, of which the largest is Marmora, famous for its quarries of marble and alabaster.

Marmoset, *mahr'mo zet*, a name of several small South American monkeys, the smallest of the monkey tribe. They are agile in their movements, possess long tails and have a thick, woolly fur. They bear a close resemblance to squirrels in general appearance, feed upon fruit and insects and occasionally upon the smaller birds and their eggs. One species, known as the *silky marmoset*, has a long, silky mane on the head and neck.

Marmot, a small gnawing animal, classed with the squirrels. It lives in Europe, northern Asia and North America. Marmots have thick bodies, short tails and short legs. They live in large communities in long burrows. During the winter they lie in deep sleep. The prairie dog, or prairie marmot, of North America, is



MARMOTS

the most familiar species. Another species found in America is the woodchuck of the middle states. See PRAIRIE DOG; WOODCHUCK.

Marne, *mahrn*, a river of France, the largest tributary of the Seine on its right. It rises in

the plateau of Langres, flows northwest and enters the Seine about three miles above Paris. Of its course of 310 miles about 220 miles are navigable.

Maroc'co. See Morocco.

Marque, mahrk, and Repri'sal, LETTERS OF, a license or commission granted by the supreme power of one State to the citizens of this State to make reprisals at sea on the subjects of another, under pretense of indemnification for injuries received; that is, a license to engage in privateering. Letters of marque were abolished among European nations by the Treaty of Paris of 1856. The United States was invited to accede to this agreement, but declined.

Marquesas, mahr ka'sas, Islands, or Mendana, mayn dah'nya, Islands, a group of volcanic islands in the Pacific Ocean, about 8° 11' south latitude and 140° west longitude. There are thirteen islands and islets, and their joint area is about 480 square miles. The principal products are yams, breadfruit and cocoanuts. These islands were discovered in 1595, rediscovered in 1791 and named Washington Islands. They became part of French territory in 1842 and are governed by a French commissioner. Population in 1900, 4300.

Marquette, mahr ket', MICH., the county-seat of Marquette co., 58 mi. n. w. of Escanaba, on Marquette Bay of Lake Superior and on the Duluth, South Shore & Atlantic and the Marquette & Southeastern railroads. The city is one of the principal shipping points of ore from the Lake Superior mining region. It has quarries of brown stone, iron works, foundries, machine shops, sash and blind factories, flour and lumber mills and other works. The Northern State Normal School is located here, and the city has a Federal building, a manual training and high school building, an opera house, Peter White Public Library, Episcopal and Roman Catholic cathedrals and the Upper Peninsula State Prison and House of Correction. The place was settled in 1845, when the iron mines were first worked. It was chartered as a city in 1869. Population in 1904, 10,665.

Marquette, JACQUES (1637-1675), a French Jesuit missionary and explorer in America. He came to Canada in 1666, founded Sault Sainte Marie in 1668 and in 1673 accompanied Joliet upon his exploration of the Mississippi. In the following year, Marquette founded a mission among the Illinois indians, but contracted fever and died before reaching Upper Michigan. His

pure character and lofty aims gave him a powerful influence among the indians with whom he labored. Wisconsin has placed his statue in the rotunda of the Capitol at Washington.

Marriage, mar'rij, an assumed relationship between a man and a woman, by which they are united for life and attain the legal status of husband and wife. Different localities have different forms of the institution, the most broadly marked of which are connected with the right of a man to have only one wife, *monogamy*, or his right to have several wives, *polygamy*. Marriage is now commonly regarded as a civil contract and is held to be valid only when both parties are able and willing to contract according to certain established forms. In the Roman Catholic Church, marriage is considered a sacrament. The Church does not, however, deny the validity of marriage as a civil contract. It does deny its benediction upon the marriage of a Catholic with one of a different religion.

The laws in relation to marriage in the United States are founded mainly on the laws of England. Though the different states have different statutes on the subject, most of them requiring ceremony in the adoption of the relation, there is a consensus of intent that no specific form in marriage is necessary, if the consent of the parties is proved. The old common law marriage of England, which was evidenced by declared intention and acknowledgment in connection with cohabitation, is valid in most states of the Union. In some states the parties are required to obtain a license, which is issued only to those legally capable of marriage. Until recently, the courts of each state recognized as valid a marriage contracted in any other state; but recently the courts of a number of states have refused to recognize the validity of marriages in some others. In this country each state fixes the age of consent, and there is no uniformity of legislation in this respect, though there has recently been a movement toward raising this age, and in most states it is now either sixteen or eighteen years. Minors must obtain the consent of their parents or guardians to the marriage.

The peculiarly sacred character of marriage has distinguished the marriage contract, in the eyes of the law. It cannot be set aside or abrogated by consent of the parties, nor on proof of fraud, except in rare cases. See DIVORCE; HUSBAND AND WIFE.

Mar'ryat, FREDERICK (1792-1848), an English sailor and novelist. He entered the navy as

midshipman when he was but a boy, became a lieutenant at twenty and took part in the War of 1812 against the United States. For saving more than a dozen lives during his naval service, he was given a gold medal by the Royal Humane Society. His experiences on the sea gave him the materials for most of his novels, among which are *Frank Mildmay*, *Peter Simple*, *Mr. Midshipman Easy* and *The Phantom Ship*. Marryat has been called "the Dickens of the sea."

Mars, *mahrz*, the fourth planet from the sun, and because it is next beyond the earth and most nearly like our earth, the one most interesting to us. To the naked eye it appears as a bright star shining with a reddish light. Mars moves round the sun in a little more than 686 of our mean solar days, at an average distance of about 140,000,000 miles, its greatest distance being 152,000,000 miles, and its least, 126,000,000. Its distance from the earth varies from 35,000,000 to 244,000,000 miles, and at its nearest approach to the earth it is about 148 times as far away as the moon. It rotates on its axis in 24 hours, 37 minutes, 22 seconds, and has a diameter of about 4200 miles. As it takes Mars about two years to complete its revolution around the sun, the seasons on the planet are similar to our own, but about twice as long. As Mars is similar in size and of less density, its gravitation is only about one-third of that of the earth, so that a weight of three pounds on the earth's surface would weigh but one pound on the surface of Mars. In 1877 two satellites were discovered by Professor Hall of the Naval Observatory, Washington. These are among the smallest of the heavenly bodies and are supposed to be only about 7 miles in diameter. One revolves about the planet in a period of 30 hours, and the inner one, which was only about 3700 miles from Mars, revolves about it in 9 hours. When examined through a small telescope, Mars appears to have a yellowish surface, marked with indistinct and irregular gray patches. While the surface of the planet generally seems to have a hazy appearance, one of the poles may show a white cap. Under a stronger telescope the irregular patches are shown to be connected by gray lines which intersect in every direction. These patches and lines are constant, and maps have several times been made of them. For a long time it was thought that the gray tract and lines were water, and the lighter portions, land; but now it is quite certain that both are solid, as the surface of both is irregu-

lar, often mountainous. It is thought that water cannot exist upon the planet because the atmosphere, which is thin and light, contains little or no moisture. The caps seen at the poles are probably frost or some condensed gas, for they are only seen during the period which corresponds to our winter. Mars has been the subject of a great deal of speculation and extravagant comment concerning its "canals" and inhabitants, but the scientists know, without a reasonable doubt, that it is impossible for Mars to be populated by beings like ourselves.

Mars, the Roman god of war, called by the Greeks, Ares. He was the son of Jupiter, and like him he was often called *father*, especially by the Romans, who regarded his son Romulus as the founder of their city. He was a fierce and terrible god, who delighted in the rush and noise of battle, and from him kindnesses were never expected. That he was not, however, absolutely unable to feel any softer emotions was shown by his love for Venus. Although he was the god of war and was able to protect his favorite warriors, he himself was not invulnerable, but was wounded at various times. Mars was greatly feared, and human sacrifices were sometimes offered on his altar.



MARS

Villa Ludovisi, Rome.

Marseillaise, *mahr say yayz'*, Hymn, the war-song of the French Republic. The words were written in 1792 by Rouget de l'Isle, an officer in garrison at Strassburg, on the occasion of a body of volunteers leaving that city for the war against Austria and Prussia. The poem was entitled by him *Chant de Guerre de l'Armée du Rhin* (War-Song of the Army of the Rhine). It was called *Marseillaise* because it was first sung in Paris by volunteers from Marseilles.

Marseilles, *mahr saylz'*, (French, *Marseille*), a city of France, the principal commercial seaport of the country, on the Mediterranean, capital of the Department of Bouches-du-Rhône. It is situated on the northeastern shore of the Gulf of Lyons, 200 miles southeast of Lyons, and it lies in the form of an amphitheater round a natural harbor of moderate size, now known

as the Old Harbor. The most noteworthy buildings are the cathedral, the episcopal palace, the palace of justice, the ancient church of Saint Victor and the Hôtel de Ville. In recent times, Marseilles has made great progress in its extent, street improvements and commerce, owing largely to the conquest of Algeria and the opening of the Suez Canal. The most important manufactures are soap, soda and other chemical products, olive and other oils, sugar, machinery, iron and brass work, candles, glass, earthenware and furniture. Marseilles was founded by a colony of Greeks from Asia Minor, about 600 B. C. The original name was Massilia. The city was taken by Caesar in 49 B. C., and on the decline of the Roman Empire it became a prey to the Goths, Burgundians and Franks. In 735 it fell into the hands of the Saracens; in the tenth century it came under the dominion of the counts of Provence, and for some centuries after it followed the fortunes of that house. Population in 1901, 491,161.

Marsh, a tract of wet land, partially or wholly covered by water. Marshes are formed by springs or rivulets, the flow of whose outlet is obstructed. They may occur on slopes, but are usually found on low and nearly level lands, and they are frequently extensive in alluvial plains along the lower courses of rivers. Salt marshes are found along the shore of the ocean, where the land is low and nearly level. Marshes on hillsides often constitute bogs (See Bog) and quagmires. Sometimes such marshes loosen the soil and cause landslides. Many marshes are the site of peat bogs, and most of them contain more or less muck (See PEAT). Good illustrations are the cypress swamps along the Mississippi River in Mississippi and Louisiana.

Marshal, *mahr'shal*, a word of German origin, signifying originally a man appointed to take care of horses. The title of marshal in the German Empire had its origin in a similar title under the Frankish monarchs. The marshal had to superintend the ceremonies at the coronation of the emperor and on other high occasions. There is still a marshal at the head of the households of German sovereigns. In France *maréchal de France* is the highest military honor. In Germany *general field marshal* is the highest military honor. In the United States a marshal is an executive officer connected with the Federal courts. The same name is popularly applied to the chief police officer of a village or small town.

Marshall, Mo., the county-seat of Saline co., 80 mi. e. of Kansas City, on the Chicago & Alton and the Missouri Pacific railroads. The city is near deposits of coal, salt and building stone and has manufactures of flour, lumber, creamery products, brick, tile, wagons and canned goods. The Missouri Valley College, the San Saviour Academy and a state institution for feeble-minded are located here. The city has a fine courthouse and an opera house. It was settled in 1839 and was incorporated as a city in 1866. Population in 1900, 5086.

Marshall, TEX., the county-seat of Harrison co., 45 mi. n. w. of Shreveport, La., on the Texas & Pacific and the Texas Southern railroads. The city is in a fertile agricultural region, producing cotton, fruit and vegetables. It contains foundries, machine shops, cotton presses, lumber mills, carriage works and railroad shops. Wiley University and Bishop College for negroes are located here, and the city has a fine courthouse and an opera house. Population in 1900, 7855.

Marshall, JOHN (1755-1835), a distinguished American jurist, born at Germantown,



JOHN MARSHALL

Va. He did not go to college, but early began the study of law, which was interrupted only by four years of distinguished service in the Revo-

lutionary War. He was admitted to the bar in 1781, served several terms in the Virginia legislature, and as a member of the Virginia convention was influential in securing the ratification of the Federal Constitution. He was a firm supporter of Washington's administrations, but declined public office under the nation until 1797, when he was sent with Gerry and Pinckney to settle several points of dispute with France. In 1798 Marshall was elected to Congress, became secretary of state in 1800 and in the following year was appointed chief justice of the United States Supreme Court. In this office he proved himself one of the greatest of the world's jurists, and several of his decisions established extremely important points of interpretation of the Federal Constitution (See DARTMOUTH COLLEGE CASE; MARBURY VERSUS MADISON). He held the office of chief justice until his death.

Marshall Niel, *neel*, or **Marechal Niel**, a popular tea rose, cultivated in hothouses. It is a climbing plant and bears pale yellow roses, with soft, light-green leaves.

Mar'shalltown, IOWA, the county-seat of Marshall co., 60 mi. n. e. of Des Moines, on the Chicago Great Western, the Iowa Central and the Chicago & Northwestern railroads. The city is in a stock raising and agricultural region, in which wheat and corn are the chief products. It contains grain elevators, flour mills, glucose works, packing houses, machine shops and other factories. 'The state soldiers' home is located here. The place was settled in 1860 and was chartered as a city in 1868. Population in 1905, 12,045.

Mar'shalsea Prison, a prison built in the twelfth century and located in Southwark, London. It was at first a king's bench prison, but latterly it served as a poor debtor's prison. In 1849 it was abolished.

Marsh'field, Wis., a city in Wood co., 185 mi. n. w. of Milwaukee, near the center of the state, on the Chicago & Northwestern and the Wisconsin Central railroads. It has a large trade in grain and live stock and extensive manufactures of lumber and lumber products. The city contains a fine city hall, seven churches, a public library, a hospital and a sanatorium. The place was settled in 1871 and was chartered as a city in 1883. Population in 1905, 6035.

Marsh Gas. See METHANE.

Marsh Hawk or **Harrier**, a fine, light, bluish-gray hawk, that hunts over marshy regions

and wet grounds. It is a long-winged bird, capable of strong flight; it should be favored by agriculturists, because of the great numbers of insects and troublesome animals it destroys. In the spring time the male may often be seen performing marvelous aerial evolutions, rising, falling, whirling over and over, sometimes almost at the surface of the ground and again far up in the air, in his efforts to attract the attention of the female.

Marsh Mal'low, a common European plant, growing in great abundance in marshes, especially near the sea. It is employed medically and is used in the preparation of lozenges and confectionery. It is perennial and has a white, fleshy, carrot-shaped root, which may be used as food. The stem is from two to three feet high. Both leaves and stem are covered with soft down, and the flowers are flesh-colored.



MARSH MALLOW

Marsh Tre'foil. See BUCKBEAN.

Marston, *mahr's'ton*, **Moore**, a locality in Yorkshire, England, about 7 mi. west of York, celebrated for the battle between the royal forces, under Prince Rupert, and the troops of Parliament, under Fairfax and Cromwell, July 2, 1644. The royal forces were completely defeated.

Mar'supia'lia, an order of mammals, composed of several families, confined almost wholly to Australia and America, though in geologic times they lived in Europe and more widely everywhere. Marsupial animals live in trees, on the ground or, in a few instances, in water. They are generally like the other mammals, but differ in one striking peculiarity: the young are born in an immature state and are placed immediately by the mother in a pouch, where they attach themselves to the nipples and remain until fully developed. The pouch is permanent and differs in many respects from the temporary pouch of the duck-billed platypus, in which the

young are hatched from eggs. The young marsupials remain in the pouch until they are clothed with fur and are able to care for themselves, but for some time after they are able to move about they return to the mother's pouch as a refuge. See KANGAROO; OPOSSUM.

Marten, *mahr'ten*, the name of several flesh-eating animals. The body of the marten, like that of the weasel, is elongated and slender. The legs are short, and the feet are provided with five toes, armed with sharp claws. In habit, martens differ from weasels in living in trees, which they climb with great ease. The *pine marten* is found chiefly in Great Britain and Europe. It is of smaller size than the common marten, is of a dark-brown color, with a yellowish mark on the throat, and has fine fur, which is largely used for trimmings. The famous *sable marten*, which furnishes the valuable sable fur, inhabits Siberia, and is nearly allied to the pine marten. *Pennant's marten*, or the *fisher*, as it is popularly called, is another well-known species.

Martha's Vineyard, *vin'yurd*, an island off the coast of Massachusetts, forming the principal part of Dukes County. It is about 4 miles south of the mainland and is 23 miles long and from 2 to 10 miles broad. It contains several towns and seaside resorts.

Martial, *mahr'shal*, in full, MARCUS VALERIUS MARTIALIS, (about 40-about 104), a Roman writer of epigrams, born at Bilbilis, in Spain. He went to Rome when young, during the reign of Nero, and lived there under Galba and the following emperors. Domitian gave him the rank of tribune and the rights of the equestrian order. In 100 A. D. he returned to Spain, to his native city, where he died. His celebrity is founded on fourteen books of epigrams, which for the most part depict with remarkable good sense and pungent wit the life of imperial Rome.

Martial Law, the law by which the discipline of an army is maintained, applying only to persons in actual military service and only to their conduct in such service. The jurisdiction under martial law is vested in a distinct tribunal, known as a court-martial, appointed by some superior officer. Under special circumstances of insurrection or rebellion, where the ordinary law is insufficient to protect life and property, it is sometimes necessary to administer the law according to the practice of military courts, by an armed force occupying the

disturbed district. The district is then said to be under martial law.

Mar'tin, a large, purple swallow, common in the United States, where it is widely distributed throughout the summer, though it winters in Central and South America. The male is a beautiful blue-black, and from its large size and vigorous flight it is a conspicuous bird wherever it lives. The martins have become thoroughly accustomed to the presence of man, and they build freely in bird houses or even in the crevices and under the eaves of inhabited buildings. There are several species of true martins, a name which unfortunately is locally given to other birds; for instance, the kingbird is sometimes called the bee martin.

Martineau, *mahr'ty no*, HARRIET (1802-1876), an English author of French Huguenot descent, born at Norwich. She wrote for periodicals, chiefly religious papers, when a girl, and when she found herself compelled to earn her living, she turned to literature. In 1834 Miss Martineau visited the United States, and after her return she published *Society in America* and *Western Travel*. In 1839 and 1840 appeared *Deerbrook* and *The Hour and the Man*, two novels, the first of which acquired a wide popularity. *Eastern Life, Past and Present*, the result of a visit made by her to the East, contained a statement of her religious beliefs, which had changed from Unitarianism to agnosticism. Among her other works of importance may be mentioned her *History of England During the Thirty Years' Peace*, *The Playfellow*, children's stories, and the autobiographic *Life in the Sick Room*.

Martineau, JAMES (1805-1900), an English Unitarian minister and writer, brother of Harriet Martineau. He held pastorates in Dublin and in Liverpool, was for years professor of mental and moral philosophy at Manchester New College, and when that institution was removed to London in 1853 he took up his residence in London. In 1868 he became principal of the college. His writings include *The Rationale of Religious Inquiry*, *Unitarianism Defended*, *Endeavors After the Christian Life*, *Hours of Thought on Sacred Things*, *Study of Religion* and *The Seat of Authority in Religion*.

Martinique, *mahr te neck'*, one of the French West India Islands, belonging to the Windward group, 30 mi. s. by w. of Dominica and 20 mi. n. of Saint Lucia. The island is about 39 mi. long and 10 to 15 mi. wide and has an area of 380 sq. mi. The form is irregular and

the coasts are rugged, while the surface is rough and mountainous, culminating in Mont Pelée, which has an altitude of 4500 feet. Like the other islands of the group, Martinique is of volcanic origin. The climate is humid, but not unhealthful. The principal products are sugar cane, coffee, cocoa and tropical fruits. Martinique was discovered by Columbus, and in 1635 it was settled by the French. The population previous to 1902 was about 200,000. In 1902, in May and in August, occurred destructive eruptions of Mont Pelée, which destroyed the city of Saint-Pierre, until that time the largest and most important city on the island, and killed from 30,000 to 35,000 people.

Mar'tinsburg, W. VA., the county-seat of Berkeley co., 75 mi. w. of Washington, on the Baltimore & Ohio and the Cumberland Valley railroads. The town has a fine Federal building, a hospital, a female seminary and a female institute. It is near valuable stone quarries and contains railroad shops, clothing factories, wool and hosiery mills, distilleries, canneries and other factories. As the chief town in the lower Shenandoah Valley, it was an important town in the military operations of the Civil War, and many minor engagements were fought here. Population in 1900, 7564.

Martin's Ferry, OHIO, a city in Belmont co., on the Ohio River, nearly opposite Wheeling, W. Va., and on the Baltimore & Ohio, the Pennsylvania and other railroads. It is in a region that has deposits of coal, iron and limestone, and it contains manufactures of stoves, shovels, nails, glass and lumber and machine-shop products. The city has an interesting burial place, known as Walnut Grove Cemetery. Martin's Ferry was settled about 1769. Population in 1900, 7760.

Mar'tyrs (witnesses), a name applied by the Christian Church to those persons who, in the early ages of Christianity and during the great persecutions, suffered ignominy and death rather than renounce their faith. Festivals in honor of the martyrs seem to have been observed as early as the second century. The Christians offered prayers at the tombs of the martyrs, thanked God for the example which they had given to the world, delivered eulogies, read accounts of the lives of the deceased and concluded the rites with the sacrament of the Lord's Supper and the distribution of alms.

Mar'vell, ANDREW (1620-1678), an English political and miscellaneous writer, educated at Trinity College, Cambridge. On the death of

his father he made the tour of Europe and afterward was appointed assistant to Milton in his office of Latin secretary. In 1660 he was chosen a member of Parliament for his native place, which he represented so honorably to the end of his life that he gained the name of the "English Aristides." Besides a small number of musical poems, he composed much humorous and satirical verse.

Marx, *mahrks*, KARL (1818-1883), a German socialist. He studied law and philosophy at Berlin. After editing a liberal paper at Cologne from 1841 till its suppression, he went in 1844 to Paris, where he took part in the publication of the *Deutsch-Französische Jahrbücher* and a liberal newspaper. In 1845 he was compelled to flee to Brussels, and he there became head of the central committee of the socialists. Banished from Germany, he went in 1849 to London, which was his home from that time. In 1864 he established the International Workingmen's Association, which for a time had wide influence. His chief work is *Das Kapital* (Capital), which sets forth his socialistic ideas and is the text-book of modern scientific socialism.

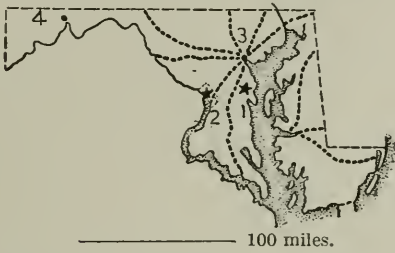
Ma'ry I (1516-1558), queen of England, daughter of Henry VIII by Catharine of Aragon. She ascended the throne on the death of Edward VI, in 1553, after an attempt to set her aside in favor of Lady Jane Grey. One of her first measures was the restoration of the Roman Catholic prelates, who had been superseded in the late reign, and the suppression of all changes in the Church. Her marriage to Philip II of Spain, united as it was with a complete restoration of the Catholic worship, produced much discontent. Under Philip's influence a war began with France, which ended in the loss of Calais in 1558, after it had been in the hands of the English for more than two hundred years. This caused Mary the greatest grief. In the later years of her reign the persecution of the Protestants took place, which won for Mary her title of "Bloody Mary." But the executions, to the number of three hundred, which she sanctioned, were permitted only because she believed the restoration of the Catholic religion to be an absolute necessity and saw no other way of accomplishing it.

Mary II (1662-1694), queen of England, the daughter of James II of England. She was married in 1677 to William, prince of Orange, and when the Revolution dethroned her father, Mary was declared joint possessor of the throne with William.

Mary

Mary, THE VIRGIN, the mother of Jesus. The story of her life, so far as it is given in the New Testament, begins with her betrothal to Joseph and the narrative of the birth of Christ. She is thrice mentioned during Christ's public ministry and once after his death. A tradition asserts that she lived and died at Jerusalem, under the care of John; another that she died at Ephesus, to which she and John had retired from the siege of Jerusalem. She is a perfect example of Christian womanhood.

Maryland, *mer' y land*, the OLD LINE STATE, one of the South Atlantic states, bounded on the n. by Pennsylvania and Delaware, on the e. by Delaware and the Atlantic Ocean, on the



MARYLAND

1, Annapolis; 2, Washington; 3, Baltimore; 4, Cumberland.

Dotted lines indicate chief railroads.

s. and s. w. by Virginia and West Virginia, from which it is separated by the Potomac River, and on the w. by West Virginia. The western and southern boundary lines are very irregular. The length of the northern boundary is 235 miles, to which must be added 35 miles for the northern boundary by Delaware, so that the extreme length of the state from the western boundary to the ocean is 270 miles. Its greatest breadth from north to south is 128 miles. The area, including Chesapeake Bay, is 12,210 square miles, but without the bay, 9860 square miles. Population in 1900, 1,190,050, of which 256,620 were colored.

SURFACE AND DRAINAGE. Chesapeake Bay and the Susquehanna River divide the state into two portions, known as the eastern and the western shores. The eastern division is low, nearly level, sandy and, withal, fertile. In the north the surface of this division is diversified by a number of low, rounded hills. The western portion of the state is crossed by the Blue Ridge, the central Appalachian and the Alleghany Mountains, making this region decidedly mountainous, though there are no high altitudes, the highest peaks reaching 2500 and 3000 feet.

Maryland

These ranges are nearly parallel and are separated by deep valleys, and the entire region is wooded. The portion of the state lying between the mountains and Chesapeake Bay is rolling and hilly. The mountainous region is celebrated for its beautiful scenery.

The Potomac, flowing along the western and southern borders, is the largest river within the state. The longest stream of importance is the Susquehanna, which crosses the state from the north. Other streams are small, except at their mouths, where many of them have estuaries. Flowing into Chesapeake Bay on the west are the Pawtuxent, the Patapsco, the Gunpowder and the Susquehanna. On the east are the Elk, the Sassafras, the Chester, the Choptank and a number of others. The important tributaries of the Potomac are the Monocacy, the Antietam and the Youghiogheny.

CLIMATE. The climate is mild and healthful. The mean summer temperature is 75°, and the mean winter temperature, 34°. No section is free from snow, and cold waves of short duration occur during the winter months. The average annual rainfall in the western portion is 38 inches, and near the Atlantic coast it is 46 inches.

MINERAL RESOURCES. Coal occurs in large quantities in the northwestern portion of the state, the veins being from one to fourteen feet in thickness. The annual output exceeds 5,000,000 tons. Iron, copper, limestone and marble occur in limited quantities in the vicinity of Baltimore. Among other valuable minerals are slate, chrome, potter's brick, porcelain clays and hydraulic cement.

FISHERIES. The oyster beds of Chesapeake Bay are famed for their size and the excellent quality of their product. Oyster fishing is one of the important industries of the state. The area of the beds exceeds 200 square miles, and during the season over 7000 small vessels are employed in dredging, scraping and tonging for oysters. The output of canned oysters for 1900 was valued at \$2,417,000, while the value of those sold in bulk was equally great. Shad, menhaden, mackerel and crabs are also taken in large quantities.

AGRICULTURE. The eastern shore or that portion of the state between Chesapeake Bay and the ocean is remarkably well suited by soil and climate to the growth of fruit and vegetables, and a large part of this region is devoted to these branches of agricultural industry. Truck farms and fruit orchards prevail. The northern part

Maryland

of the state is well suited to growing wheat, corn, grass, Irish and sweet potatoes and tobacco. The most important crops are corn, wheat, hay, oats, tobacco and potatoes. In the regions adapted to grazing, considerable numbers of horses, mules and cattle are raised, and dairy farming is practiced to quite an extent.

MANUFACTURES. Maryland is not essentially a manufacturing state, but since 1890 all lines of manufacturing industry have been extended and the value of products has steadily increased. The leading industries are the canning and preserving of fruits and vegetables, canning and preserving oysters and other shellfish, the manufacture of tobacco, slaughtering and meat-packing, the production of iron and steel and foundry and machine-shop products, shipbuilding and the manufacture of textiles. The leading manufacturing interests center in and about Baltimore.

TRANSPORTATION AND COMMERCE. While the Atlantic coast has no good harbors, the coast of Chesapeake Bay affords many excellent harbors for vessels of light draft, and that of Baltimore is open to the largest ocean steamers. The Potomac is navigable as far as Washington, 125 miles. The Baltimore & Ohio, the oldest railway in the country, has lines connecting Baltimore with Philadelphia and Washington and also with the Ohio valley. The Pennsylvania system, the Western Maryland and the Baltimore & Lehigh traverse the state in various directions. The Chesapeake and Ohio Canal extends from Georgetown, D. C., to Cumberland and is still maintained as a common carrier, chiefly for coal. The commerce consists largely in the exportation of fresh and preserved fruits, coal, oysters and other fish and some textiles and iron and steel products, and the importation of raw material, manufactured goods not made in the state and some food products.

GOVERNMENT. The legislature consists of a senate of 27 members, apportioned one to each of 23 counties and 4 to the city of Baltimore, and a house of delegates of 101 members, apportioned among the counties according to population, each of the four districts of Baltimore city having a number of delegates equal to that of the largest county. The members of the senate are elected for four years, but the terms of one-half expire every two years. The members of the house of delegates are elected for two years. The legislative sessions are biennial and are limited to ninety days. The executive authority

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is vested in a governor, who is elected for four years; an attorney-general, elected for four years, and a comptroller of the treasury, elected for two years. A treasurer is elected on joint ballot by the legislature, for two years. Appointments are made by the governor and confirmed by the senate. The highest court is a court of appeals, composed of the chief judges of the seven country circuits and the circuit of Baltimore. In each circuit except that of Baltimore, the chief judge and two associates are elected, and they must hold court in each county of the circuit. These courts have both civil and criminal jurisdiction in important cases and are courts of appeal from cases arising in courts of the justices of the peace. Local administration is by counties.

EDUCATION. The public schools of the state are in charge of a board of education and a superintendent of public instruction appointed by the governor. The governor appoints school commissioners for each county, and the county commissioners appoint school trustees for the districts. The law requires ten months of school in each district whenever it is possible for a term of that length to be sustained. Separate schools are provided for white and colored children. The Maryland state normal school is at Baltimore. There is a second normal school at Frostburg and a normal department in Washington College. The important higher institutions of learning are Johns Hopkins University (See **JOHNS HOPKINS UNIVERSITY**), the University of Maryland and the Woman's College, all located at Baltimore; Saint John's College at Annapolis; the agricultural college in Prince George's County; Western Maryland College at Westminster; Washington College, and the Jacob Tome Institute, at Port Deposit.

INSTITUTIONS. Schools for the blind and deaf are located at Baltimore and for the deaf at Frederick. The school for feeble-minded children is at Owings Mills; the hospitals for the insane are at Sykesville and Spring Grove. The penal institutions include the state penitentiary at Baltimore, a house of refuge for boys and a similar institution for girls.

CITIES. The chief cities are Annapolis, the capital; Baltimore, Cumberland, Hagerstown, Frederick and Cambridge, each of which is described under its title.

HISTORY. Maryland was first settled in 1634 by the English, under the auspices of Cecilus Calvert, Lord Baltimore, of England. It was established through the efforts of George

Calvert, first Lord Baltimore, and was intended to be a refuge for persecuted Catholics of England. It was the home of religious toleration from its foundation. Its early history was disturbed by conflicts between the proprietary party and Virginian traders, the former finally being successful. Another source of trouble was the boundary dispute with the heirs of William Penn, which was finally decided in 1767 by the establishment of Mason and Dixon's Line (See MASON AND DIXON'S LINE). In the pre-Revolutionary period, Maryland was aggressive in defense of colonial rights, and she took a prominent part in the Revolutionary War. She was the last to adopt the Articles of Confederation, owing to her insistent demands that the large states relinquish their territorial claims in the northwest (See ORDINANCE OF 1787). She adopted the Federal Constitution in April, 1788. The first half of the nineteenth century witnessed marked progress in Maryland through the establishment of an elaborate policy of internal improvements, including canals, railroads and telegraph lines. During the Civil War Maryland remained loyal to the Union, though a slave-holding state, but sent many soldiers to both armies. Since the close of the war Maryland has been a doubtful state politically, though usually favoring the policies of the Democratic party. Consult William H. Browne's *Maryland*, in the American Commonwealths Series.

Mary Mag'dalen. See MAGDALEN, MARY.

Mary Stuart (1542-1587), queen of Scotland. She was born at Linlithgow Palace and was the daughter of James V by his queen, Mary of Lorraine, a princess of the family of Guise. Her father dying when she was a few days old, she was proclaimed queen, and the regency was, after some dispute, vested in the earl of Arran. Mary was educated in a French convent, and in 1558 she married the dauphin, afterward Francis II. He died seventeen months after his accession to the crown, and the young queen returned to Scotland. The calamities of Mary began with her marriage to her cousin, Lord Darnley, in 1565. Darnley was a Roman Catholic, and Mary had hoped that his influence might be of help to her in her claims to the English throne; but his weakness and profligacy soon won her contempt. He almost entirely alienated the queen by his complicity in the murder of Rizzio, Mary's Italian counselor, though a reconciliation seemed to be effected between them about the time of the

birth of their son, afterward James VI of Scotland and I of England. At the close of the same year, however, Darnley withdrew from the court, and in the meantime the earl of Bothwell had risen high in the queen's favor. Darnley had fallen ill at Glasgow, and Mary visited him and took measures for his removal to Edinburgh. He was there tended by the queen herself; but during the absence of Mary at a masque at Holyrood, the house in which Darnley lay was blown up by gunpowder, and he was killed. The circumstances attending this crime were very imperfectly investigated, but popular suspicion pointed to Bothwell as the ringleader in the outrage, and the queen herself was suspected of complicity, suspicion becoming still stronger when she was carried off by Bothwell, with little show of resistance, to his castle of Dunbar, and was married to him. A number of the nobles now banded together against Bothwell, who succeeded in collecting a force; but on Carberry Hill, where the armies met, Bothwell was defeated. The queen was forced to surrender herself to her insurgent nobles, Bothwell making his escape to Denmark. The confederates first conveyed the queen to Loch Leven Castle. A few days later a casket containing eight letters and some poetry, all said to be in the handwriting of the queen, fell into the hands of the confederates. They were held to afford unmistakable evidence of the queen's guilt, and she was forced to sign a document renouncing the crown of Scotland in favor of her infant son and appointing the earl of Murray regent during her son's minority. After remaining nearly a year in captivity Mary succeeded in making her escape and made an effort for the recovery of her power. Defeated by the regent's forces, she fled to England and wrote to Elizabeth entreating protection and a personal interview; but this the latter refused to grant until Mary should have cleared herself from the charges laid against her by her subjects. For more than eighteen years she continued to be the prisoner of Elizabeth, and in that time the place of her imprisonment was frequently changed, her final prison being Fotheringhay Castle, Northamptonshire. She was at last accused of being implicated in the plot of Babington against Elizabeth's life, was tried by a court of Elizabeth's appointing and was condemned to be executed. There was a long delay before Elizabeth signed the warrant, but this was at last done in February, 1587. Mary received the news with serenity and dignity.

which did not desert her on the scaffold. Authorities are more agreed as to the attractions, talents and accomplishments of Mary Stuart than as to her character.

Masai, *mah'si*, a negro people in British East Africa. They are of large stature and have short, curly, black hair, a chocolate complexion and slightly oblique eyes. There are several tribes, which differ from one another decidedly, some of them almost approaching the Caucasian type in facial features. They are nomadic in habits, wear but little clothing, are fond of gaudy ornaments and believe in witchcraft. There is a separate warrior class; but the warriors, after serving a certain time, settle down to married life and prepare the weapons for their successors. See RACES OF MEN, *color plate*, *Negro Types*, Fig. 5.

Masaya, *ma sah'ya*, a city of Nicaragua, capital of the Department of Masaya, situated 13 mi. by rail w. n. w. of Granada, on the Lake of Masaya. The town is an important railway center and is at the foot of a volcano, which was active in 1902. Population, about 20,000.

Mashonaland, a region in the northeast of Matabeleland, Africa. The surface is mainly a fertile plateau, 3000 to 5000 feet high and intersected by several rivers. The region has an extremely healthful climate and is in the midst of valuable gold, iron and copper fields. Gold has been found in large quantities, and settlements have grown up in many places. Mauch, a German traveler, discovered many old mines which at one time had been very valuable, especially at a place called Zimbabwe, which was identified with the Ophir of the Bible. Many ruins consisting of old stone structures and walls have been found here, though their origin is not yet known. In 1890 Mashonaland was acquired by the British South Africa Company, and Fort Salisbury was made the seat of administration.

The Mashonas are of the Bantu race and are a peaceful, agricultural class, raising corn, sweet potatoes, rice, indian hemp and tobacco. A common occupation is hunting for gold. Population, about 396,500.

Mask, a covering for the face, used either as a disguise or as a protection. Masks have been worn since ancient times, and their use in the drama originated in the festivities of the Greeks in connection with the processions and ceremonies attending the worship of Dionysus or Bacchus. In Greek tragedy, which grew out of this worship, masks were common from the

first, and later they were used in comedy. They were sometimes only coverings for the face and sometimes covered the whole head, with huge open mouths, provided with metallic mouth-pieces for the purpose of strengthening the voice of the speaker, a device which was necessary because of the great size and the construction of the ancient theaters. In the Roman drama, also, the mask was common. The use of masks at balls and masquerades originated in Italy, where the domino, or half-mask, was worn by the women and was especially popular. See FACES, FALSE.

Maskat, *mahs kah't*, or **Muskat**, *mus kah't*. See MUSCAT.

Ma'son, GEORGE (1725-1792), an American politician, born in Stafford County, Va. He was elected to the assembly of Virginia in 1759 and was a leader in the opposition to the British policy. He continued to have great influence throughout the Revolutionary period, but confined his activity to state affairs, as a member of the committee of safety, the constitutional convention and the state legislature. In 1787 he was elected delegate to the Federal constitutional convention and with Patrick Henry of the same state he refused to sign the instrument and exerted his influence against its ratification by Virginia. He was elected United States senator, but declined the office.

Mason, JAMES MURRAY (1798-1871), an American lawyer and politician, born in Fairfax County, Va., and educated at the University of Pennsylvania. He entered politics and was elected to the state legislature, to the national House of Representatives for one term and finally to the United States Senate, where he served from 1847 to 1861. In the latter year he withdrew to assist the secession movement, having been a faithful advocate of the Southern cause and the author of the famous Fugitive Slave Law. In 1861 he was appointed representative of the Confederacy abroad, and, while sailing for Europe in the British steamer *Trent*, he was captured with his colleague, John Slidell, and taken to Boston (See TRENT AFFAIR). After being released, he went to London, where he endeavored to win recognition for the Confederacy, but without success. He returned to America after the war and lived in Canada until 1868, when he removed to Virginia.

Mason, JEREMIAH (1768-1848), an American lawyer and politician, born in Lebanon, Conn., educated at Yale University, and admitted to the bar in 1791. He began the practice of

law in New Hampshire, residing at Portsmouth after 1797. There he soon won a place at the head of the state bar, though among his rivals were Daniel Webster and other famous lawyers. In 1802 he became attorney-general of the state. In 1813 he was elected to the United States Senate, and there he became conspicuous for his powers as an orator. He resigned in 1817, but thereafter he served at different times in the state legislature. In 1832 he removed to Boston, where he practiced his profession until his death.

Mason, JOHN YOUNG (1799-1859), an American politician, born in Sussex County, Va., educated at the University of North Carolina. He was admitted to the bar, was chosen to numerous important positions upon the bench and in 1844 was made secretary of the navy by President Tyler. In the following administration he became attorney-general, was again transferred to the navy department and in 1853 was appointed minister to France by President Pierce. There he remained until his death and won special fame as a conspicuous member of the famous Ostend Conference (See OSTEND MANIFESTO).

Mason and Dixon's Line, the line which separates the states of Maryland and Pennsylvania. From the time of the grant of the latter territory to William Penn in 1681, there were disputes between the family of Penn and that of the Lords Baltimore, the possessors of Maryland, as to the boundary between the two territories. An agreement was formed in 1763 by which the line was fixed by two English surveyors, Charles Mason and Jeremiah Dixon. Milestones were set up along the whole of this boundary line. Mason and Dixon's line is commonly spoken of as the boundary between the so-called *South* and the *North*, owing to the fact that it was, before the Civil War, the dividing line between the slaveholding and the free territory.

Mason Bee, a bee distinguished from others by the manner in which it constructs the small earthen cells in which it lives. These are made of sand, pebbles, chips, sawdust and other substances, firmly glued together and smoothed on the inside. They are usually made in groups of from 10 to 20. In these the larvae are deposited, with the honey and pollen stored for their food. These bees are of comparatively small size and are dark in color.

Mason City, IOWA, the county-seat of Cerro Gordo co., 90 mi. n. e. of Fort Dodge, on the

Chicago Great Western, the Chicago, Milwaukee & Saint Paul and several other railways. The city is in an agricultural and stock-raising region, containing valuable clay and sandstone deposits. It has a large trade in agricultural produce, groceries and fruits. The National Memorial University is located here, and there is a public library, a fine courthouse and an Odd Fellows' Home. The place was settled in 1855. Population in 1905, 8357.

Ma'sonry, the name commonly given to a secret fraternal organization of ancient origin. It is also called *Freemasonry*, owing to the fact that the members of the society call themselves Free and Accepted Masons. According to legend, the beginnings of Masonry can be traced as far back as the time of King Solomon, and some enthusiasts even declare that it has existed since the building of Noah's Ark. However, its definite history is known to extend only to the sixteenth century. It is now believed to have arisen from the medieval guilds of masons and architects, the most skilled of whom had organizations, bound together by signs and passwords, which represented the secrets of their trade. However, it was not until the beginning of the eighteenth century that permanent lodges were reestablished upon the principles which form the basis of the modern organization. There was then established a grand lodge in England, which was composed of certain grand officers, chosen by the whole body of Masons; past grand officers, and, perhaps, representatives of the subordinate lodges. This body had complete legislative, judicial and executive control of the order. Each of the lesser lodges was governed by a master and several wardens, besides minor officers appointed by the master. The grand lodge, as a supreme governing body, however, soon lost much of its authority, through the establishment of similar lodges in several other countries, including France, Scotland and Ireland. All of these except France established lodges in America, the first being organized about 1730. In the following year Benjamin Franklin became a member. After the American Revolution, the American lodges, feeling that allegiance to foreign grand lodges was inconsistent with allegiance to the newly-formed American government, broke away, and the lodges of each state organized a grand lodge. This principle has been followed since, and there are now 57 such lodges in the United States and Canada.

The fundamental principle of Masonry is a

belief in God and the acceptance of a Book of the Law, which among Christians is the Bible and among Jews is the Old Testament. No lodge can be opened unless the book of the law lies open upon the altar. Masons are also expected to believe in the immortality of the soul and in the resurrection, and peculiarly impressive symbols are used to represent these principles. The order also inculcates moral principles, of which the chief are charity, truth, temperance and justice. Though in the constitution of the order there is no provision for the payment of set or regular dues for the relief of members or others, all Masons are expected to relieve to the extent of their ability brother Masons, their widows and orphans, when in distress.

Secrecy is required under severe oaths of all members, and there are many secret ceremonials and symbols, which are intended to emphasize the precepts of the order. The 57 grand lodges in the United States and Canada had, in 1905, a membership of 1,062,425, of which about 50,000 were in Canada. Besides these, there are 38 grand lodges of colored Masons in the United States and one in Canada, including, all told, about 100,000 members.

Masque or **Mask**, a dramatic entertainment much in favor in the courts of princes during the sixteenth and seventeenth centuries, particularly in England. In its earliest form it is perhaps best described as a masquerade, with an arranged programme of music and dancing and a banquet. The first masque of this kind in England, according to Holinshed's *Chronicles*, was performed in the early part of the sixteenth century, and masques were frequently introduced into the plays of Shakespeare, Beaumont and Fletcher. The parts in the masques of the sixteenth and seventeenth centuries were usually taken by the first personages of the kingdom; at court the king, queen and princes of the blood often performed in them. Under James I the masque assumed a higher character, more care being expended in its preparation. In the writing of such works Ben Jonson takes an important place, his masques, despite much that is frigid and pedantic, having not a little genuine poetry. Inigo Jones was for a number of years exclusively employed upon the decorations and elaborate machinery of the court masques, and Henry Lawes wrote the music for several of them. Milton's *Comus* is, from the literary point of view, the most beautiful of the productions which bear the name of masque,

though it is possibly defective in the matter of spectacle and music. The taste for masques decreased in the reign of Charles I, and after the interruption given to the progress of dramatic art and literature by the civil war they were not again brought into fashion.

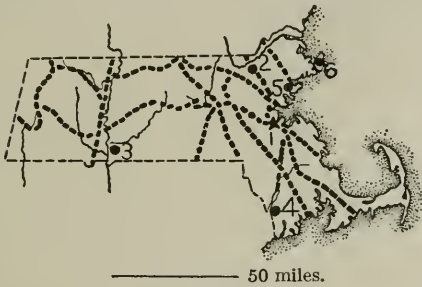
Mass, in the Roman Catholic Church, the prayers and ceremonies which accompany the consecration of the eucharist, or all that part of the Catholic service in which the eucharist is offered. At present the mass consists of four chief parts, (1) the introduction, (2) the *offertorium*, or sacrifice, (3) the consecration, (4) the communion. These four chief parts, of which the latter three are considered the most essential, are composed of several smaller parts, each having its proper denomination. They consist of prayers, hymns, shorter and longer passages of the Holy Scriptures and a number of ceremonies, which, as the essential point of the mass is the sacrifice of the Lord, consist partly of symbolical ceremonies commemorative of important circumstances in Jesus Christ's life, or signs of devotion and homage paid to the presence of the Lord in the host. The order of these ceremonies, and of the whole celebration of the mass, is given in the missal, or mass book. Mass can be offered only by a priest, and he must have fasted absolutely from the midnight previous till the morning of the service. Each priest may offer three masses on Christmas, but only one on other days, unless there be a lack of priests, when two masses may be offered on Sunday. *Votive mass* is an extraordinary mass, instead of that of the day, rehearsed on some special occasion. *Low mass* is the ordinary mass, performed by the priest without music. *High mass* is celebrated by the priest, assisted by a deacon and sub-deacon or other clergy, and sung by the choristers, accompanied by the organ and other musical instruments. A mass for the dead is called a *requiem*.

Mas'sachu'set, a confederation of indian tribes which formerly lived along Massachusetts Bay. Although at one time a leading group, they suffered terribly from pestilence and disease, until in 1646 they ceased to have a separate tribal existence.

Massachusetts, the OLD BAY STATE, one of the New England states, bounded on the n. by Vermont and New Hampshire; on the e. by the Atlantic Ocean; on the s. by the Atlantic Ocean, Rhode Island and Connecticut, and on the w. by New York. Its greatest length from east to west is 184 mi., its average breadth is

48 mi. and its greatest breadth is about 113 mi. The land area is 8040 sq. mi. Population in 1905, 3,003,680.

SURFACE AND DRAINAGE. The eastern portion of the state is low and slightly undulating. That part extending southward to Buzzard's Bay and Nantucket Sound is especially low and sandy. An extension of this plain forms Cape Cod Peninsula. The northern portion of this division contains some low hills and is more generally diversified than the southern. The



- 1, Boston; 2, Lowell; 3, Springfield; 4, Fall River, 5, Lynn; 6, Gloucester.
Dotted lines indicate chief railroads.

irregular coast line contains a number of deep indentations which form good harbors, such as Boston Bay, Cape Cod Bay and Buzzard's Bay, while on the south extensions of Narragansett Bay touch the state in two places. To the west of this region and occupying all of the central portion of the state, is an area diversified by low ranges of hills, which are outlying sentinels of the White Mountains. This is a beautiful country, consisting of hills, valleys, numerous streams and many clear lakes and ponds. The western part of it slopes gradually to the Connecticut River. West of the Connecticut River the surface rises to the mountains which, under the name of Berkshire Hills, cross the state from north to south. These are an extension of the Green Mountains and consist of two distinct ranges, the Hoosac Mountains and, farther west, the Taconic range, forming the western boundary of the state. These ranges are separated by deep valleys. This combination of hill, valley, stream and lake renders a large part of Massachusetts notable for the beauty of its scenery. In the Connecticut Valley are a number of low, isolated peaks, of which Mount Holyoke and Mount Tom are the most widely known.

All of the rivers have worn deep channels and flow through comparatively broad valleys. The Merrimac, watering the extreme northeastern

part of the state, is navigable for about 18 miles, but is chiefly important for its water power. Its important tributaries from Massachusetts are the Concord and the Nashua. In the southeastern part of the state, the Taunton, flowing into Narragansett Bay, is the most important stream. The Connecticut crosses the state from north to south and is the largest river. It receives from the east Miller's, the Bachelor and the Chicopee rivers, and from the west the Green, the Deerfield and the Westfield. The Housatonic flows between the Hoosac and Taconic mountains southward into Long Island Sound, and the Hoosac, which rises in the northern part, flows in a northwesterly direction to the Hudson. None of these streams is navigable except for small boats, but all of them, besides many smaller mountain streams, are important for the water power which they furnish, and the location of such manufacturing centers as Lowell, Lawrence, Waltham and many smaller places is due to the falls in the streams where the towns are situated. The state contains a large number of small lakes, usually known as ponds. Industrially these are of little importance, but they add greatly to the beauty of the scenery, and some of them are sources of water supply for neighboring cities.

CLIMATE. The climate is variable, especially along the coast, with prevailing east winds. In the mountainous regions, the winters are rather severe. In the interior, the temperature is more equable. The temperature ranges from 20° below zero to 100° above; the mean annual temperature is 48°; the average rainfall, 44.99 inches.

MINERAL RESOURCES. Massachusetts is not rich in minerals, although it is the leading state in the production of granite and emery. Granite is produced in considerable quantities in several of the eastern counties. Hampden County, a little west of the center on the southern boundary, contains extensive quarries of sandstone. Limestone is quarried in the western part of the state and is used principally in the manufacture of lime. Clay suitable for brick, tile and pottery is quite generally distributed over the state, and in some localities there are valuable slate quarries.

FISHERIES. Massachusetts is one of the leading states in the catching and curing of fish. Many towns along the coast are almost entirely devoted to this industry. Cod, halibut, herring and mackerel are taken off shore in large numbers, while many fishing fleets make peri-

odical voyages to the Grand Banks for the catch of cod. On the south coast are extensive oyster beds, and other varieties of shellfish are also found in this vicinity. At Woods Hole, on Buzzard's Bay, is one of the most important stations of the United States Fish Commission.

AGRICULTURE. The valleys of the Connecticut, the Housatonic and other streams are fertile and well suited to agriculture, but the slopes of the mountains and parts of the hill country consist of a rocky, unproductive soil and are covered with trees, so that agriculture is not a leading industry in Massachusetts. Farming is largely confined to the production of milk, cream, garden truck and the raising of poultry, since these products are in great demand in the numerous cities in the state. Some cereals, hay, tobacco and potatoes are also raised. Fruits, such as apples, pears, plums and peaches, are raised in abundance, but the state is especially noted for its cranberries, which are raised on the marshy lands in the southeastern part.

MANUFACTURES. The abundance of water power and the excellent shipping facilities have combined to make Massachusetts one of the most important manufacturing states. She is now exceeded in this line only by New York, Pennsylvania and Illinois. In the production of cotton and woolen goods and boots and shoes Massachusetts leads all the other states. The great centers of cotton manufacture are Lowell, Lawrence, Fall River and New Bedford. Lawrence is also an important center for the manufacture of woolen goods. The leading cities in the manufacture of shoes are Lynn, Brockton and Haverhill. Waltham contains the largest watch factory in the world. Machinery, tools, electrical apparatus and supplies, hardware and carriages are also made in large quantities. Another important industry in which the state takes first rank is the manufacture of paper from wood pulp. The great paper mills at Holyoke have attained more than a national reputation for the quality of writing paper which they produce, and much of the best book paper is also made within the state. Other industries of less magnitude, but still important, include the manufacture of rugs and carpets, silks, furniture, silverware and jewelry, and slaughtering and meat-packing. The manufacturing centers are widely distributed over the state, though they are most numerous in the eastern portion.

TRANSPORTATION AND COMMERCE. There are good harbors at Boston, New Bedford and Provincetown, which admit the largest ocean steamships. Railways extend through the state in every direction, so that almost every town has railway communication. These lines either belong to, or are connected with, the great systems extending to the west and south and thus afford access to the great markets and sources of supply of raw materials in those regions. The chief railroad center of the state is Boston. Another of importance is Springfield, and the great centers of communication with which these are connected in neighboring states are New York and Albany. Electric lines connect neighboring towns, and a number of systems have been extended long distances. These lines are multiplying from year to year, and their mileage already exceeds that of the steam railways. Carriage roads are unusually good, so that Massachusetts is well provided with transportation facilities.

The commerce of the state is very extensive, the foreign commerce being exceeded only by that of New York. Of this trade Boston is the great center, and it has direct steamer connection with many of the leading ports of Europe. Boston is not only the chief seaport of New England, but it has been for many years one of the principal outlets for the grain and meat of the west. The extensive commerce of Massachusetts is due largely to the variety and extent of her manufactures. The imports consist largely of wool, hides, fibers and vegetable grasses and other raw materials for the factories, while the exports include cereals, cattle and dressed meats, lumber and cotton from the west and south and fish and all lines of manufactured goods produced in the state.

GOVERNMENT. The legislature, known as the general court, consists of a senate of 40 members and a house of representatives of 240 members, each elected annually. The executive department consists of the governor and the lieutenant governor, also elected annually. The governor is assisted by a council of eight members, elected annually by districts. The judiciary department comprises a supreme court, with a chief justice and six associates, and a superior court, consisting of a chief justice and twenty-two associates. The judges for these courts are appointed by the governor, with the advice and consent of the council. Below these are the municipal and police courts in Boston and large towns and the district courts. Counties have

probate courts and courts of insolvency. Local government is by township, and it was in Massachusetts that this peculiar form of government originated. The affairs of the town are in the hands of three or five officers, known as selectmen, who, together with other township officials, are elected at the annual town meeting, in which every voter of the town has the right to vote.

EDUCATION. The first free school and the first college in the United States were established in Massachusetts. The state has not only the oldest, but is generally considered to have the best, system of public schools in the Union. There is a state board of education, the secretary of which is virtually the superintendent of public instruction. This board employs supervisors, or state agents, each having general supervision of a certain portion of the state, known as a district. The town is the local unit for school purposes, and the schools of the rural communities, as well as those of the cities, are under thorough and efficient supervision. Towns of sufficient population have a superintendent, who devotes his entire time to the schools of that town, but smaller towns are obliged to combine in the employment of such an official. The state maintains ten normal schools, which devote their entire time to the training of teachers. There is no state university, but there is a state agricultural college at Amherst. Chief among the higher institutions of learning are Harvard University, Amherst College, Williams College, Massachusetts Institute of Technology, Worcester Polytechnic Institute, Clark University and Tufts College. Among the colleges for women are Mount Holyoke College, Wellesley College, Smith College, Radcliffe College, which is closely allied with Harvard University, and Simmons College. In addition to these colleges and universities the state contains a large number of secondary schools, colleges and professional schools, maintained either by church denominations or as private enterprises.

INSTITUTIONS. The state schools for the deaf are located at Northampton and Boston. The blind are educated at the Perkins Institute and Massachusetts School for the Blind in Boston. The hospitals for the insane are at Danvers, Medfield, Northampton, Taunton, Westboro and Worcester. There is a reformatory for men at Concord and one for women at Sherborn. The state prison is at Boston.

CITIES. Massachusetts contains a greater number of large cities than any other state in the

Union. The most important of these are Boston, the capital; Worcester, Fall River, Lowell, Cambridge, Lynn, Lawrence, New Bedford, Springfield, Gloucester, Somerville, Holyoke and Brockton, each of which is described under its title.

HISTORY. The coast of Massachusetts was probably explored by the Norsemen about 1000 A. D.; by the Cabots in 1497; by Bartholomew Gosnold, who attempted to make a settlement on the Elizabeth Islands in 1601, and by John Smith in 1614. But a permanent settlement was not made until 1620, when about one hundred English Separatists, who had for several years lived in Holland, landed at Plymouth (See **PLYMOUTH COLONY**). In 1630 a company of Puritans, also from England, settled at Salem, and this village, with other settlements, made soon at Boston and elsewhere, formed the Massachusetts Bay Colony. Two contrary principles were conspicuous in the life of the Massachusetts Bay Colony, one an insistence upon political self-government, the other a rigid adherence to religious intolerance. However, some of its leaders were among the most admirable figures in early American history (See **ENDICOTT, JOHN**; **WINTHROP, JOHN**; **DUDLEY, THOMAS**). Religious intolerance led to the banishment of Roger Williams and Anne Hutchinson about 1636, the persistent persecution of the Quakers and, later, of the supposed witches. Numerous indian wars caused great suffering during the seventeenth century. In 1692 Plymouth and Massachusetts Bay were united under a new charter, less liberal than the preceding ones. (For other details of the early history of Massachusetts, see **NEW ENGLAND CONFEDERATION**; **KING PHILIP**; **WITCHCRAFT**.)

During the eighteenth century the colony of Massachusetts experienced rapid development, which was impeded only by the troubles with the French and indians (See **FRENCH AND INDIAN WARS**), the strife with the king for the maintenance of its charter, and minor boundary disputes with neighboring colonies. Massachusetts led in the pre-Revolutionary struggle, furnishing not only ideas but leaders. It was the scene of some of the most important of the early events of the war (See **BOSTON MASSACRE**; **BOSTON TEA PARTY**; **LEXINGTON, BATTLE OF**; **BUNKER HILL, BATTLE OF**). The first state constitution was adopted in 1780, and it abolished slavery within Massachusetts. The heavy taxes which were imposed on account of the Revolution led to a rebellion in 1786, known as Shays's

Rebellion (See SHAYS'S REBELLION). Massachusetts was among the first to ratify the Constitution (January, 1788), but during the early years of the Republic the state was strongly Anti-Federalist. After 1797, however, Federalism predominated until the downfall of the party, partly on account of the Hartford Convention, with which Massachusetts was closely associated. The anti-slavery movement of later years practically started in Massachusetts, and during the Civil War the state furnished to the Federal army about 160,000 men, its governor, John A. Andrew, being one of the most conspicuous of the "war governors." Since the Civil War the state has been prominent in all reform movements, especially with regard to education, temperance legislation and the laboring classes. It has been almost uniformly Republican in national politics. Consult C. F. Adams's *Massachusetts, Its Historians and History*.

Massachusetts Bay, an indentation on the eastern coast of Massachusetts, bounded on the n. by Cape Anne and on the s. by Cape Cod. The name sometimes includes Cape Cod Bay, also.

Massachusetts Bay Colony, the colony established by a body of English Puritans at the present site of Salem, Mass., in 1628. The first colony consisted of a party of sixty, under the leadership of John Endicott. This company was, from the very first, practically independent of English control, and authority was formally transferred to America in 1630. Massachusetts Bay Colony suffered from sickness, internal dissension and poor management, and later, from the most vigorous religious persecution in American history, causing the separation of many of its prominent members and the establishment of other towns and colonies, notably New Hampshire, Rhode Island and Connecticut.

Massachusetts Institute of Technology, a scientific and industrial school of high grade, established in Boston in 1865. The original plan upon which this school was founded provided not only for the study of principles, but for the training of students in their practical application to various professions and occupations, and it was the first school of high grade established in the United States upon this plan. It now maintains thirteen courses of study, each extending over four years and leading to the degree of Bachelor of Science. These courses are civil engineering, mechanical engineering, mining engineering and metallurgy, architecture,

chemistry, physics, biology, electrical engineering, chemical engineering, general studies, sanitary engineering, geology and naval architecture. All of these departments are very closely affiliated, so that the work of each assists and strengthens that of all the others. There are also postgraduate courses in most of these departments. The institute has a number of laboratories constructed on a very large scale, so that much of the work done in them assumes the proportion of that in actual industrial establishments. This enables the students to solve many problems in a practical way and thus to fit themselves for taking prominent positions in engineering or industrial works. The number of instructors is about 225, and the number of students is about 1700; among these are found representatives from all states in the Union and from about twenty foreign countries.

Mas'sage, or *ma sahzh'*, a form of medical treatment in which the body of the patient, or some particular part of it, is stroked, rubbed, kneaded, pinched, pressed, squeezed and hacked by the hands of a skilled attendant. The effect of this treatment is to assist and stimulate the circulation and to increase the waste-removing action of the lymphatic vessels. The nutrition, not only of the parts acted upon, but of the whole body, is thus improved, swellings are reduced and inflammation decreased. The process, for which half an hour daily is usually sufficient, is performed upon the naked skin by the bare hands of the operator. The attendant needs strong, firm, soft hands and must be carefully trained. Moreover, he should have a sufficient knowledge of anatomy to be able to locate with the fingers a single muscle or group of muscles for treatment, and to trace the direction of the larger vessels and nerve-trunks and act upon them directly. The principal movements should be characterized by a certain uniformity and method. Thus, in stroking the limbs of the patient, the strokes should always be from the extremities toward the heart, not backward and forward in a random way. The treatment has been remarkably successful in cases of nervous disorders of a hysterical kind, and in cases of wasting through imperfect nutrition dependent upon disturbances of stomach, bowels or liver. See OSTEOPATHY.

Mas'sasoit (1580-1661), chief of the Wampanoag Indians. When the whites first knew this tribe, its numbers were small and the people were feeble and ready to make an alliance with the whites. The treaty was not broken for

fifty years, and Massasoit was always faithful. His home was near the site of the present town of Bristol, R. I. At his death his son Philip became king. See KING PHILIP.

Massenet, *mas nay'*, JULES EMILE FREDERIC (1842-), a French composer. He studied at the Paris Conservatoire and in 1878 became a professor there. He composed several operas, of which the best-known are *Herodias*, *Don César de Bazan* and *Le Cid*. They are notable for their fine instrumentation. He is also well known as a song writer.

Mas'sey, GERALD (1828-), an English poet, born near Tring, Herefordshire, of poor parents. For some time after he was fifteen years old, he was an errand boy in London. He wrote verse when but a boy, and in 1848 he founded a radical paper, called the *Spirit of Freedom*, some of his writings in which attracted wide attention. Among his published volumes are *The Ballad of Babe Christabel and Other Poems*, *My Lyrical Life*, *Shakespeare's Sonnets Never Before Interpreted* and *The Secret Drama of Shakespeare's Sonnets*.

Mas'sillon, OHIO, a city in Stark co., 65 mi. s. of Cleveland and 8 mi. w. of Canton, on the Tuscarawas River and the Ohio Canal and on the Baltimore & Ohio, the Pennsylvania and other railroads. It is in a noted bituminous coal field and has quarries of valuable white sandstone. The industrial establishments include foundries, rolling mills, machine shops, bridge works, potteries, glass works, flour mills and creameries. A state hospital for the insane is located here. The place was founded in 1825, was incorporated as a village in 1853 and became a city in 1868. Population in 1900, 11,944.

Mas'taba, the name applied by the Egyptian Arabs to the tombs of the Memphite dynasties in ancient Egypt. These tombs are oblong structures, with the appearance of a pyramid cut squarely off at the top. The size varies from 19×25 feet to 84×172 feet. Some mastabas are solid, and some are chambered; the latter have a doorway, set in the recess which opens up into the chamber or chapel, often adorned with beautiful mural paintings.

Master and Servant. In law, a servant, in the narrowest sense, is one who owes his services to another for a limited period, but cannot bind the latter by contract. Servants are of two classes, namely, those who engage to perform certain duties for certain wages, and those known as apprentices, who may receive wages

but are at the same time taught a trade. The following are the important rules governing the relations of master and servant in the United States: (1) In the absence of any stipulation or local custom the term of service is presumed to be terminable at the pleasure of either party; (2) if the term of service is stipulated and the contract be broken without justification by the servant, he cannot recover unpaid wages for services already rendered; (3) he may be discharged for immorality, disobedience, gross negligence or gross incompetence, but if he be discharged unjustly he may sue either for wages for services rendered or for these and other damages sustained; (4) the master is liable for damages sustained by the servant in his ordinary labor, when due to the neglect of the master to furnish suitable instruments or conditions, providing that the employe did not realize the danger or had not complained of it within a reasonable time; (5) the master may sue a third party for injuries to his servants, which cause the loss of services; (6) the master is liable for offenses committed by his servants against third parties, if the act was within the scope of the servant's authority.

By recent statutes, known as Employer's Liability Acts, in both England and the United States, the responsibility of employers for the act and offenses of their servants has been extended so as to include, among other things, the responsibility of certain actions of one against another and, especially, the actions of superior employes to their subordinates. See AGENCY.

Master of Arts, an academical honor conferred by the universities of the United States, Germany, Great Britain and other countries upon students, after a course of study and a previous examination in the chief branches of a liberal education, particularly languages, philosophy, mathematics, physics and history. The precise period of the introduction of this title is not known; but even in the twelfth and thirteenth centuries the honor was so highly esteemed in France that the most distinguished men were eager to obtain it. Afterward, when the universities were multiplied, and many abuses crept in, it lost much of its importance.

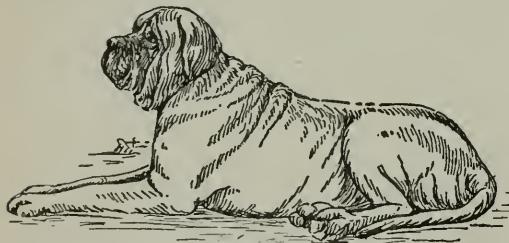
Mas'tersingers (German, *Meistersinger*), the name of a literary guild or association which flourished in Mainz, Strassburg, Augsburg, Nuremberg and various other German cities, in the fourteenth and fifteenth centuries, in some cases surviving even to recent times. The work of this association was the expression in

Mastication

poetry of burgher life, as that of the Minne-singers had been the expression of the feudal chivalry. The members of the guild met and criticised each other's productions in accordance with a remarkable series of canons dealing with literary form. Victory in their own competitions carried with it the right to take apprentices in songcraft, who, after serving out their term and after singing for some time satisfactorily, were themselves admitted as full masters. The most famous of the master-singers was Hans Sachs, who, unlike most others of the guild, was a true poet. The development of artificial canons in the search for novelty ultimately reduced the whole scheme to utter absurdity.

Mastication, *mas ti ka'shun*, the process of dividing the food by the combined action of the jaws and teeth, the tongue, the palate and the muscles of the cheeks. By it the food, besides being finely divided, is mixed with the saliva. Imperfect mastication is a source of indigestion. See **DIGESTION**.

Mas'tiff, a large dog of the hound group. The mastiff is a noble-looking dog, with a large head, a broad muzzle, thick lips, which hang down on each side of the mouth, hanging ears



MASTIFF

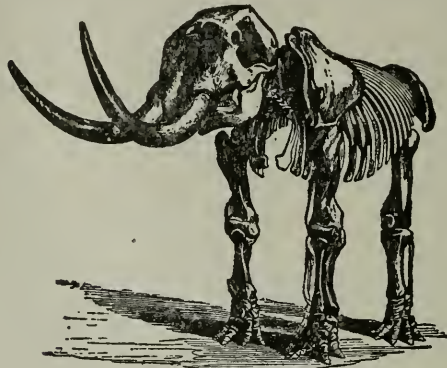
and smooth hair. The height of the shoulders usually ranges from twenty-five to thirty inches. The usual color is some shade of buff, with dark muzzle and ears. Mastiffs are good watchdogs and are also prized as pets.

Mas'todon, an extinct genus of elephants, the fossil remains of which first occur in the Miocene rocks of the Tertiary period and persist through the Pliocene and Post-Pliocene epochs. In general structure, the mastodons bear a close resemblance to the existing species of elephants. Their chief peculiarities consist in the form and structure of the teeth and in the curious mammillary processes from which the name is derived. The geographical range of the mastodons included North America, Europe and Asia;

Matches

an American specimen measured 18 feet in length and 11 feet 5 inches in height.

Matabe'le, a Kaffir race or tribe, inhabiting part of the British colony of Rhodesia, South Africa, between the Limpopo and the Zambesi,



MASTODON

north of the Transvaal, into which they removed from Natal in 1827, under the leadership of their chief, Moselikatse. They are a warlike people, estimated to number about 40,000.

Matamoros, *mah ta mo'ros*, a town of Mexico, situated in the State of Tamaulipas, on the right bank of the Rio Grande, about 28 mi. above its entrance into the Gulf of Mexico. Population in 1900, 8347.

Matan'zas, a seaport of Cuba, capital of the province of the same name, on Matanzas Bay, about 56 mi. e. s. e. of Havana. It has a large, safe and very convenient harbor, and it ranks in commercial importance next to Havana. The chief exports are sugar, molasses, coffee and tobacco. Population in 1902, 45,282.

Matches, small splints, or slips of wood, one end of which is dipped into a composition which takes fire by friction or other means. One of the first forms of match was the brimstone match, which consisted of a thin strip of dry pine wood, with a pointed end dipped in sulphur. These matches were lighted with tinder ignited by a flint and steel. In 1827 the ordinary friction or lucifer match was introduced. The head of this match contained a mixture of chlorate of potash and sulphide of antimony, which had been previously dipped into melted sulphur. These matches were ignited by being drawn through a piece of folded sandpaper. Improvements on the lucifer match consist principally in producing a composition which will ignite with less friction and in covering this with some substance that protects it from the humidity of the

atmosphere. For many years sulphur was a prominent ingredient of the heads of matches, but owing to its disagreeable odor it has now been discarded in favor of paraffin.

Pine or poplar wood is used in the manufacture of matches, and in the United States the work is all done by machinery. The wood is first freed from all knots and cross-grained sections, then dried and sent to the factory, where it is cut into two-inch planks. The planks are cut into pieces the length of a match, and these pieces are then cut by knives or dies into strips containing splints for matches or into individual matches, according to the plan of the plant. These splints are placed in cast iron plates which form an endless chain that moves along over a heated block, where they are warmed so that the paraffin into which the end is dipped will not harden on the surface. From the warming block the splints pass over shallow tanks or pans containing the various substances that make the head, in the order in which they should be added. As they pass along, the ends of the matches are dipped successively into each of these pans. The heads are dried by blasts of air, and the matches are then dropped in quantities into boxes which the machine places on the table. The boxes are then covered and packed for shipping.

Safety matches are made by placing a part of the substance for the head on the match and the rest on the box. The match cannot be ignited unless the head is rubbed over this prepared surface.

Mate, *mah'tay*, or **Paraguay Tea**, a plant of the holly family, raised in Paraguay, Brazil and some other South American countries. Its leaves are extensively used in the place of tea. The plant is in the form of a large shrub or small tree, with smooth leaves and small flowers. The tea is made by placing the dried leaves in a vessel and pouring boiling water upon them. The liquid is usually drunk by sucking it through a small tube, which has a strainer at the end which is placed in the vessel. The drink is highly prized by the people of South America, but is usually nauseating and distasteful to others.

Mate'rialism, in philosophy, that system which denies the existence of a spiritual or immaterial principle in man, called the mind, or soul, distinct from matter. The first theory of materialism was advanced by the early Greek philosophers, who believed that everything in the universe, even the souls of men and the gods,

was made by the combination of infinite numbers of atoms, according to mathematical proportions. Since its origin, the theory has been modified many times, and modern materialism is closely associated with some theories of evolution. It denies the existence of the mind or soul as a spiritual entity and seeks to account for the activities of the mind by attributing them to the various physiological processes in the brain. The doctrine has but few followers, and it is by many considered atheistic.

Mate'ria Med'ica, the collective name given to the materials with which physicians attempt to cure or alleviate the numerous diseases of the human body. They comprehend a great variety of substances, taken from the mineral, animal and vegetable kingdoms. Among these are mercury, antimony, arsenic and zinc, from among the metallic bodies; sulphur, lime, soda, niter, magnesia, borax and several salts, from among the other minerals; and some two hundred substances belonging to the animal and vegetable kingdoms.

Math'e'mat'ics, the science which treats of magnitudes, their measurement and relations and the operations by which those relations are determined and expressed. In a large sense, any conception which can be certainly described by means of a definite number of elements or characteristics is mathematical in its nature. For instance, the notion of a *cube* is a mathematical conception, for a cube is completely described by the statement that it is a body having six equal, square faces. The notion of *man* is not mathematical in its nature, since the nature and characteristics of man cannot be wholly or definitely told.

The field of mathematics may be divided into three great departments, arithmetic, analysis and geometry. *Arithmetic* is that part of the science which deals with numbers, their nature, their properties and computations by means of them. It in turn includes three general divisions: first, the discussion of abstract number, that is, the abstract relations of magnitude existing between objects of the same kind; second, notation, by which those relations are expressed; third, the operations or computations by means of those symbols, to determine new or unknown relations. *Analysis* is that part of the science of mathematics in which the quantities upon which operations are to be performed are denoted by letters or other general symbols, and the operations themselves are indicated by special signs. Analysis includes four general

subjects: algebra, which treats of the relations and properties of numbers by means of the symbols of analysis; analytical geometry, in which the symbols and processes of algebra are applied to geometrical quantities and processes; calculus, which is that part of the science of mathematics which treats of the nature, the values and the relations of a certain number of variable quantities by means of algebraic symbols and processes, and, finally, hypergeometry, an imaginary field in which quantities of more than three dimensions are considered, their relations being determined and expressed by algebraic symbols. *Geometry* is that branch of mathematics which treats of the relations, properties and measurement of solids, surfaces, lines and angles.

Every branch of mathematics can be divided into two parts, pure, or abstract, and applied, or practical, or mixed. *Pure* mathematics treats only of theories and principles, without regard to their application to concrete things. *Applied*, or *mixed*, mathematics considers only those phases of mathematical theories and principles which have direct or practical application to objects or actions in the material world. The principles of applied mathematics have been of invaluable service in the investigation of such physical phenomena as heat, electricity, sound and optics; of kinematics in mechanics; of surveying and geodesy; of navigation, and of astronomy. In fact, almost every discovery in science during recent times has been first evolved through the medium of mathematical formulas.

The science of mathematics, as we know it, was first developed by the Greeks, although the Hindus, Babylonians, Egyptians and Phoenicians had all made some progress in the understanding and organization of the science. There is evidence that some of the most fundamental principles of algebra and the beginnings of a notation had been discovered in Egypt as early as 3000 B. C. It was nearly twenty-five hundred years later that geometry was first formally organized, but during the next three hundred years it was rapidly developed, by Pythagoras, Plato, Euclid, Archimedes and Apollonius. For many centuries after the Roman conquest of Greece, mathematical progress was confined almost wholly to the Orient. During that time the Hindus, represented especially by Aryabhata and Brahmagupta, began the investigation of the theory of numbers, made considerable progress in algebra, arithmetic, geometry and trigonometry, and first developed the present system

of notation, which is often wrongly attributed to the Arabs. The sixteenth century witnessed the first important mathematical progress in Europe, the advance beginning in Italy. Shortly afterward, there was also an awakening in France, and before the end of the century, through the labors, especially, of Descartes, Kepler, Pascal and Fermet, the science of algebra and elementary geometry had attained almost perfection, the theory of numbers had been wonderfully developed and analytical geometry had appeared. About the same time Leibnitz and Newton simultaneously expounded the theory of calculus, thus vastly extending the domain of mathematics and eventually revolutionizing all science. During modern times little addition has been made to the knowledge of the fundamental principles of mathematics, but they have been applied in a multitude of new ways and forms. Among the important subjects developed during that time are the theory of substitutions, quaternions, imaginary and complex numbers, functions, projective and descriptive geometry.

See articles on all branches of mathematics; also NUMBER; LINE; PLANE; ANGLE; SOLID.

Math'er, COTTON (1663-1728), an American minister and writer, the eldest son of Increase Mather, born in Boston. He graduated at Harvard College in 1678, and in 1684 he was ordained minister in Boston, as colleague of his father. The subject of witchcraft interested him greatly, and in 1689 he published his *Memorable Providences Relating to Witchcraft and Possessions*, which was used as an authority in the persecution and condemnation of nineteen victims burned for witchcraft at Salem in 1692 (See WITCHCRAFT). In 1693 appeared the *Wonders of the Invisible World*, a work intended to convince every one of the reality of witchcraft, and between that time and his death he produced many other works, among them the *Magnalia*, an ecclesiastical history of New England, and *Parentator*, a life of his father. He died with the reputation of having been the greatest scholar and author that America had then produced.

Mather, INCREASE (1639-1723), one of the early presidents of Harvard College, born at Dorchester, Mass. He graduated at Harvard and was ordained a minister. In 1685 he was chosen president of the college, and four years later he was sent to England as agent of the Province of Massachusetts to procure redress of grievances. He held conferences with King

James II and with William and Mary and returned to Boston with a new charter providing for the government of the province.

Matsys, *mah't'sise*, QUENTIN (1466-1530), one of the earliest painters of Antwerp. His name is sometimes spelled *Quintin Massys* or *Metsys* or *Messys*. His style was strong; his use of color was remarkable, and his fidelity to minute details, especially in jewels and ornaments, was exceptional. Most of his pictures are religious and are now scattered through the galleries of Europe. In the Museum of Antwerp is his masterpiece, a great triptych representing the burial of Christ.

Matteawan, *mat'te a won'*, N. Y., a village in Dutchess co., 45 mi. n. of New York City and 2 mi. e. of the Hudson River, on Fishkill Creek and on the Newbury, Dutchess & Connecticut railroad. It has a considerable trade in fruit, potatoes and dairy products, and contains hat factories, machine shops, silk mills, novelty works and other establishments. The state hospital for the criminal insane is located here, and the village has several other hospitals and the Howland Library. The place was settled in 1814. Population in 1905, 5584.

Matter, that which occupies space and through which force is manifested. It is also that which makes itself known to us by our bodily senses, though there is believed to exist one kind of matter, at least, which is too subtle to be perceived by the senses (See ETHER). Roughly speaking, matter exists in one of three states—solid, liquid or gaseous—but these are not marked off by any distinct line. See SOLID; GAS; LIQUID.

Mat'terhorn or **Mont Cervin**, a famous mountain of the Alps, on the boundary of the Canton of Valais, Switzerland, and Piedmont, Italy. The peak is in the form of an immense rocky horn and is very difficult of ascent. The height of the peak is 14,837 feet. It was ascended in 1865 by Whymper, Lord Douglas, Hudson and others.

Matthew, *math'u*, SAINT, evangelist and apostle, son of Alphaeus. He was, previous to his call, a publican, or officer of the Roman customs, and, according to tradition, a native of Nazareth. After the ascension of Christ we find him at Jerusalem with the other apostles, but this is the last notice of him in Scripture. Tradition represents him as preaching fifteen years in Jerusalem, then visiting the Ethiopians, Macedonians, Persians and Syrians, and finally suffering martyrdom in Persia.

Matthews, *math'uze*, (JAMES) BRANDER (1852-), an American author and dramatic critic. Noted for his charming personality and style, for his brilliant and feeling analysis of literature and life, Matthews contributed a most valuable addition to American literature by his works of fiction, his literary and dramatic criticisms and his other essays. He was born in New Orleans, La., and graduated from Columbia University and Columbia Law School; instead of practicing law, however, he at once entered upon his career by writing for the magazines. In 1892 he was appointed professor of dramatic literature in Columbia. Prominent in his long list of published works are the following: *Americanisms and Britishisms*; *Aspects of Fiction and Other Ventures in Criticism*; *The Historic Novel*; *Recreations of an Anthologist*; *Tom Paulding*, a story for children; *Vignettes of Manhattan*, containing sketches of New York life; *In the Vestibule Limited* and *The Decision of the Court*, two comedies, to be read rather than acted; *Studies of the Stage and Development of the Drama*, in the field of dramatic criticism.

Matthews, STANLEY (1824-1889), an American jurist, born in Cincinnati, Ohio, and educated at Kenyon College. He was admitted to the bar, entered politics and was chosen to the state senate in 1855. He served in minor commissions during the Civil War and succeeded General Sherman as United States senator in 1877. In 1881 President Garfield appointed him associate justice of the United States Supreme Court.

Mattoon', ILL., a city in Coles co., 75 mi. e. by s. of Springfield, on the Illinois Central and the Cleveland, Cincinnati, Chicago & Saint Louis railroads. It is in an agricultural region, where broom corn is extensively cultivated. The important industrial establishments are railroad shops, and manufactories of brooms, flour, farm implements, carriages and other articles. The principal buildings are the public library, several good schools and churches and the Odd Fellows' Home. Population in 1900, 9622.

Mauch Chunk, *mawk chunk*, PA., the county-seat of Carbon co., 46 mi. w. by n. of Easton, on the Lehigh River and the Lehigh Canal and on the Lehigh Valley and the Central of New Jersey railroads. It is in the center of a very valuable anthracite coal region. Because of its beautiful surroundings and its fine climate, it is very popular as a summer resort. Among

the interesting features here are a burning mine, and the Summit Hill coal mines, a short distance south of the village, which are famous as the richest in the state. The chief trade is in coal. The industries include foundries and machine shops. Population in 1900, 4029.

Maulmain' or **Moulmein**, a city of Burma, situated on the Gulf of Martaban, at the point where the Salwin, the Attaran and the Gyaing rivers discharge into the gulf. Maulmain has a temperate and equable climate, a beautiful town site and is a good port, except that the harbor is somewhat shallow. It carries on an extensive commerce in teak, rice, cotton and other products of the country. There are also important shipbuilding works. Population in 1901, 58,446.

Maumee', a river in Indiana and Ohio, formed by the junction of the Saint Joseph and the Saint Mary's rivers at Fort Wayne, and emptying into Lake Erie. It is about 150 miles long and flows through the northwestern part of the state. The city of Toledo is situated on its banks, and the river is navigable for 12 miles, to the Maumee Rapids.

Mauna Kea, *mah'oo nah ka' ah*, a volcanic peak in Hawaii, the highest peak in the Pacific Ocean. The mountain is in the shape of a large mound and has an altitude of 13,805 feet. It is surrounded by several cones and is covered with vegetation to within 1000 feet of its summit. During the winter the summit is covered with snow.

Mauna Loa, *mah oo'nah lo'ah*, a celebrated volcano in the Hawaiian Islands, near the center of Hawaii. It is the largest volcano in the world, being 13,760 feet high and having a crater a mile and a half in diameter. The last great eruption occurred in 1880-1881. See VOLCANO.

Maun'dy Thurs'day, the Thursday in Passion week. It used to be the custom in England and other countries, and it still is in Austria, for the sovereign to wash the feet of a certain number of poor persons and make them presents on this day. James II was the last English sovereign to perform this ceremony in person. Francis Joseph continued it from 1849 to 1888, washing the feet of twelve old men. In Rome the pope washes the feet of some of the bishops. The ceremony commemorates Christ's washing of the apostles' feet.

Maupassant, *mo pa sahN'*, HENRI RENÉ ALBERT GUY DE (1850-1893), a French novelist. After his graduation from the College of

Rouen, he served in the navy department at Paris and as a soldier in the German war. During his service as clerk, he gave much attention to writing, and under the instruction of Flaubert he became steadily more skilful. His short stories, which first won him fame, are among the best, and are by some critics considered the best, of modern short stories. Among his collections of tales are *Mademoiselle Fifi*, *Tales of the Day and Night*, *Yvette* and *Father Milon*, and among his most famous single tales is *The Necklace*. He wrote also a number of novels, among which are *A Life* and *Pierre and Jean*. His work is all morbid, but it is characterized by a wonderful art and by psychological insight. For three years before his death he was partially insane, and his insanity became complete in 1892.

Maurice, *maw'ris*, Duke and Elector of Saxony (1521-1553), a famous German general. He was a Protestant, but on the outbreak of the struggle between Charles V and the Protestants, he joined Charles, hoping thereby to gain the electorate of Saxony, which belonged to his cousin. He won several victories, and as a reward for his services he received the title and estates of the elector of Saxony. Shortly afterwards, perhaps because he realized that he was losing popularity with his subjects and that Protestantism was really in great danger, he deserted Charles and joined the Schmalkaldic League. By his successes he forced Charles to agree to the Treaty of Passau, which granted religious liberty to the Protestants. Maurice was killed in a battle against the margrave of Brandenburg in 1553.

Mauritius, *maw rish'e us*, (formerly Ile de France), a British island in the Indian Ocean, 550 mi. e. of Madagascar. It is oval in form, about 705 square miles in area and is surrounded by coral reefs. The island is composed chiefly of rugged and irregular mountains. Between the mountains and along the coast are large, fertile plains and rich valleys. The climate is pleasant during the cool season, but it is oppressively hot in summer. The principal products are sugar, rice, maize, cotton, coffee, manioc and vegetables. The government is vested in a lieutenant governor and a legislative council. Mauritius was discovered in 1505 by the Portuguese, who retained possession of it until 1598, when it passed to the Dutch. The French took it about 1710, and it was captured by the British in 1810. The principal town is Port Louis, the capital. Popula-

tion in 1901, 378,195, about 3000 of whom are whites.

Maury, *mo re'*, MATTHEW FONTAINE (1806-1873), an American naval officer and hydrographer, born in Virginia. He entered the United States navy in 1825 and later was lamed by an accident, after which he quitted active service afloat for scientific work at the Washington Observatory. He wrote valuable papers on the Gulf Stream, ocean currents and great circle sailing, besides a *Physical Geography of the Sea*, which gave him a wide reputation. At the outbreak of the Civil War he entered the Confederate service, in which he obtained the rank of commodore. After the close of the war he went to Mexico, Russia and England, and in 1868 he became professor of physics in the Virginia Military Institute.

Mausole'um, the tomb of Mausolus, a king of Caria, erected by his wife Artemisia at Halicarnassus in 353 B. C. It became so famous as to be esteemed one of the seven wonders of the world. In modern times the term *mausoleum* is applied to any costly sepulchral edifice.

Maxim, HUDSON (1853-), an American inventor and engineer. He devised a process for printing daily papers in colors, and was the first manufacturer of smokeless gunpowder in the United States. He developed the Maxim-Schupphaus smokeless powder used by the United States government. He has invented also the explosive maxinite, and the Hudson-Maxim automobile torpedo. See TORPEDO.

Maximil'ian (1832-1867), archduke of Austria and emperor of Mexico. In 1863 he was induced by Napoleon, also by a deputation of Mexican notables, to accept the throne of Mexico. With this intention he entered Mexico in 1864. Having become involved in financial and political difficulties, Maximilian, with the approval of Napoleon, resolved to abdicate, but he was induced by the Conservative party to remain. The French army which had supported him withdrew, at the stern demand of the United States government, and after a brief period of fighting the emperor and two of his chief generals were captured and executed.

Maximilian I (1459-1519), Holy Roman emperor. By his marriage with Mary of Burgundy, the heiress of Charles the Bold of Burgundy, he became involved in a war with Louis XI of France, who laid claim to part of Mary's inheritance. By the treaty concluded in 1482, he was forced to surrender Burgundy, Artois and Franche Comté to Louis, but he retained pos-

session of the Netherlands. In 1493 he succeeded his father as emperor, and his participation in the wars with France in Italy lost him Milan.

Max'ims, LEGAL, the term given to certain accepted principles of law, stated in concise language. Many of these are derived from the old Roman law; many have come down from medieval times in Europe; others were formed by early English jurists. A large majority are therefore stated in Latin. Familiar examples are *caveat emptor* (Let the buyer be on his guard); *aquitas sequitur legem* (Equity follows the law); *ubi jus, ibi remedium* (Where there is a right, there is a remedy); *prior tempore, prior jure* (First in time, first by right, or First come, first served).

Max'well, WILLIAM HENRY (1852-), an American educator, born in Ireland. He was educated at Queen's College, Galway, came to America in 1874 and was engaged as teacher in Brooklyn night schools. Later he became assistant superintendent, then superintendent of the Brooklyn public schools. On the consolidation of Brooklyn with New York in 1898, he was elected superintendent of public schools for Greater New York. He is the author of a series of English grammars and of numerous articles in educational periodicals.

May, the fifth month of the year, containing thirty-one days. The first day of May is celebrated in the country districts of England by dancing about a May pole and crowning some young lady "queen of the May." To a more limited extent the day is celebrated in the United States as May Day.

May, PHIL (1864-1903), a British comic newspaper artist, born at Leeds, England. At the age of fifteen he was put in an architect's office, but the work proving uncongenial, he soon gave it up to join a strolling theatrical troupe. While with them, he discovered his talent by making, for advertising purposes, comic portraits of the leading actors of his company. In 1882 he went to London, where he became a regular contributor to the *Saint Stephen's Review*. Afterward he was successively on the staff of the Sydney (Australia) *Bulletin*, the London *Graphic* and *Punch*. He constantly sketched from life and was one of the best of draughtsmen. In depicting boy life in the slums of London, he was especially successful. His best sketches are contained in the following publications: *The Parson and the Painter*, *Phil May's Sketchbook* and *Phil May's Annual*.

Maya

Maya, *mah'ya*, a race of indians living in Yucatan and the adjacent regions of Mexico and Central America. They were partially civilized, resembling in their habits the Aztecs of Mexico. They raised many vegetables, kept bees for their honey and were remarkably skilful in cloth weaving and feather work. The men wore armor in battle, and in times of peace they carried on trade in their sailing vessels, using a kind of money made from shells and pieces of copper. Before the time of the Spanish conquest Yucatan had been covered with cities, whose vast ruins astonished the whites and gave evidence of long occupancy by the Mayas.

May Apple, a common plant of North America, sometimes called the mandrake. Two large leaves are borne on a stem a foot or more high. From the fork between them grows a large, handsome flower, with waxy petals, which produces a yellowish, slightly acid, pulpy fruit, about the size of a pigeon's egg. From the root a powerful drug is prepared.

May Beetle. See JUNE BUG.

Mayflower, *THE*, the vessel which carried the Pilgrims from Southampton, England, to the shores of Massachusetts in 1620. It arrived in America, after a stormy voyage, in November, but landing was not made until December 11 (new style calendar, December 21). See PILGRIMS.

May Fly, *Day Fly* or *Shad Fly*, a small insect, with large fore wings and small hind wings. May flies are known as ephemera, or day flies, because of the extreme shortness of their lives in the perfect state. The larvae and pupae are aquatic and exist for years, until the latter are ready for the final change, when they creep out of the water, generally toward sunset of a summer evening; shortly after leaving the water they shed their whole skin, and after a brief flight, during which they take no food, they die. May flies are a favorite bait for fish and are imitated in artificial flies.

Maynard, *MASS.*, a village, situated in Middlesex co., on the Assabet River and on the Boston & Maine railroad 10 mi. s. e. of Marlboro. It has extensive woolen mills and powder works. Population in 1905, 5811.

Mayor, the chief magistrate of a city or corporate town in the United States, England, Ireland and the British colonies. In the United States the mayor usually is elected by the qualified voters of the city or town for a certain term of years. The power and authority which mayors possess, being given to them by local regulations, vary widely in different places.

Mazeppa

Mayot'te or **Mayot'ta**, an island in the Indian Ocean, one of the Comoros. Its area is about 137 square miles, and its population, 11,640. See COMORO ISLANDS.

Mays'ville, *KY.*, the county-seat of Mason co., 64 mi. s. e. of Cincinnati, on the Ohio River and on the Chesapeake & Ohio and the Louisville & Nashville railroads. The city is in a fertile, agricultural region and has cotton, flour and lumber mills, foundries, distilleries, tobacco, furniture and shoe factories and other works. There is a public library, and among other prominent buildings are the Odd Fellows' Hall and the Masonic Temple. The place was settled as early as 1784, was incorporated three years later and was made a city in 1833. Population in 1900, 6423.

May'weed. See CHAMOMILE.

Mazarin, *ma za raN'*, *JULES* (1602-1661), a French statesman and cardinal, an Italian by birth. He entered the pope's military service and distinguished himself by diplomatic ability, for which he was rewarded with two canonries and the appointment of nuncio to the court of France. Here he gained the favor of Richelieu and accepted service from the king. He became a naturalized citizen of France and was made a cardinal, and in 1642, when Richelieu died, Mazarin succeeded him. On the death of Louis XIII, he won over the queen regent and made himself master of the nation. The Parlement of Paris denounced his increasing taxation, while the nobility dreaded his supremacy, and the combination of these malcontents resulted in the civil war of the Fronde (See FRONDE). As the immediate result of the conflict, Mazarin had to go into exile, but finally returned to his position at court in 1653. During the succeeding eight years he remained all-powerful in France.

Mazatlan, *mah sa tlahn'*, a seaport of Mexico, in the State of Sinaloa, at the entrance of the river Mazatlan into the Gulf of California. It forms the outlet for the gold and silver of the neighboring mines and imports considerable quantities of English goods. Population in 1900, 17,852.

Mazep'pa, *IVAN STEFANOVITCH* (1640-1709), a famous leader of the Cossacks. He was of a noble Russian family and entered the service of John Casimir, king of Poland. Discovered in an intrigue with the wife of a Polish noble, he was fastened upon the back of his own horse, which was then driven out into the steppes. The horse carried him back to his home, but he

Mazzini

was ashamed to remain there and joined the Cossacks in the Ukraine. Through his ability he became their leader, and he was made prince of the Ukraine by Peter the Great. Later, however, Mazeppa, believing that it might be possible to gain complete independence for the Cossacks, joined Charles XII of Sweden, and after the Battle of Pultowa he was obliged to flee. His history has furnished a subject for paintings, novels, poems and dramas. The most famous of the poems is Byron's *Mazeppa*.

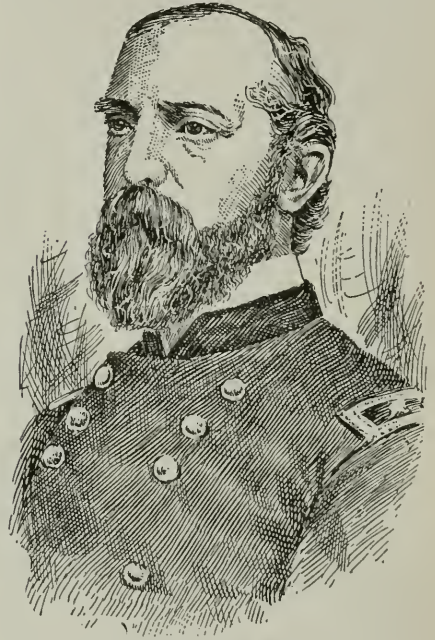
Mazzini, *mat se'ne*, GIUSEPPE (1808-1872), an Italian patriot, born at Genoa. He early began writing literary and political essays for periodicals, and as his writings grew more distinctly liberal in tone, the government suppressed several of the papers in which they appeared. Mazzini afterward joined the Carbonari, and as a result of his share in their disturbances he was imprisoned in Savona for some months. On his release he was exiled to Marseilles, but was compelled by the French government to retire into Switzerland. During the following five years he planned and organized various unsuccessful revolutionary movements, until, in 1837, he was expelled by the Swiss authorities and sought refuge in London. During the revolutionary movements of 1848 he proceeded to Italy, served for a time under Garibaldi and when the pope fled from Rome became a triumvir in its short-lived republic and made a heroic defense of the capital against the French, until compelled to surrender. From that time he continued to organize various risings in Italy, and the successful expeditions of Garibaldi were due in part to his labors. His republican principles prevented him from accepting a seat in the Italian parliament, to which he was several times elected. The society of Young Italy was organized by Mazzini.

Meade, *meed*, GEORGE GORDON (1815-1872), an American soldier, born of American parents at Cadiz, Spain. He was educated in Philadelphia, Washington and Baltimore and graduated at West Point in 1835. After serving in the Seminole War, he resigned from the army, became a civil engineer and was employed in government surveys. He reentered the engineering branch of the army in 1842 and served in the Mexican War under General Taylor. He became a captain before the outbreak of the Civil War in 1861 and in August of that year was commissioned brigadier general of volunteers. He served through the Peninsula Campaign, taking a prominent part at Mechanics-

Meadow Lark

ville, Gaines's Mill and Frazer's Farm, and was also present at the second Battle of Bull Run, and, in command of a corps at Antietam, was wounded. For his gallantry Meade was commissioned major general of volunteers.

He performed notable service at Fredericksburg and Chancellorsville, in covering the retreat of the Federal army, and in June, 1863,



GEORGE GORDON MEADE

succeeded Hooker in command of the Army of the Potomac, just at the crucial point in Lee's second invasion of Pennsylvania. Taking up a strong position at Gettysburg, he compelled Lee to give battle (See GETTYSBURG, BATTLE OF). Though winning a notable victory, he failed to pursue the Confederates promptly and thus incurred the censure of some military critics. Meade commanded the Army of the Potomac in Grant's Virginia campaign of 1864-1865, as a major general in the regular army. After the war he commanded various departments, including one of the military districts of the South during reconstruction days. Consult Pennypacker's *General Meade*, in the Great Commanders Series.

Meadow Lark, an American oriole, not related to the lark. It has a most pleasing song. It is a medium-sized bird, with a bronze mottled plumage above and a bright yellow belly, with a rich, black, crescent-shaped collar across its

breast. Its home is in the damp meadows, where it builds an oven-like nest in a hole in the ground (See NEST, *color plate*, Fig. 7). It is one of the earliest of spring birds in the Northern states. See BIRDS, *color plate*, *Birds' Eggs*.

Meadville, *meed'vil*, PA., the county-seat of Crawford co., 105 mi. n. of Pittsburg, on the French Creek and on the Erie and the Bessemer & Lake Erie railroads. The city is in a fertile valley and contains railroad shops, iron works, planing mills, breweries, silk mills and other factories. Allegheny College and the Meadville Theological School are located here. There are four music schools, two hospitals and a public library. Other important structures are the courthouse, the First Methodist Church and the Lafayette Block. It was settled in 1788 and was made a city in 1866. Population in 1900, 10,291.

Meal'y Bug, a scaly insect, so called because of the white powder which covers its body. It is a tropical or sub-tropical insect, though it is occasionally found in some parts of the southern United States, where it often does great injury to oranges. Other species are also enemies to greenhouse plants throughout the temperate regions. They are often accompanied by ants, which help to scatter them in greenhouses by carrying the young bugs to new feeding grounds. They may be exterminated by the use of a kerosene-soap emulsion, well diluted.

Measles, *me'z'lz*, a contagious disease which usually affects a person but once in a life time, generally in his youth. From the time of exposure until the disease makes its appearance in the form of weakness and fever, a period of about two weeks elapses, and the ordinary course of the illness is a week longer. The characteristic feature of the disease is a rash, which consists of little red pimples; they usually appear first on the face and neck and thence spread downward over the body. While the appearance and some of the characteristics of measles are like those of smallpox and scarlet fever, yet there need be no confusion after a day or two. After the rash subsides, the person must be kept from exposure for some little time, as colds bring about serious complications.

Measurement, *mez'h'ure ment*. See MENSURATION; UNIT; WEIGHTS AND MEASURES.

Measuring Worm, a name given to the small caterpillars of certain moths. They are long and rather slender, and their feet are grouped at the extreme ends of their bodies. Fastening their fore feet, they bring the hind

feet close up to them, thus looping the body above; then raising the head and fore part of the body, they thrust it forward to its full length. From this habit they take the name given above, as well as the names *loopers* and *inch worms*. Some have the habit of thrusting their bodies out from a branch and remaining immovable in almost perfect imitation of a broken twig. Some measuring worms are extremely destructive pests. See CANKERWORM; MIMICRY.

Meat Packing, the general name given to slaughtering animals and preparing from their carcasses the various kinds of meats placed upon the market. The leading centers of meat packing in the United States are Chicago, Kansas City, South Omaha, Saint Joseph, Mo., and New York.

PROCESSES. The animals are brought by rail from the grazing districts or the corn belt. They are unloaded into yards, called stock-yards, and sold to the packing houses. Cattle are allowed to rest twenty-four hours before slaughtering, but the hogs and sheep are driven to the abattoirs as soon as sold. The animals are driven up inclined viaducts to the top of the building, where they are killed. As they pass from one process to another, their bodies are worked downward, until, when completely dressed, they are sent to the cooling rooms on the ground floor. The work is done with remarkable rapidity. It requires less than eight minutes to dress a hog and less than forty-five minutes to dress a steer. The combined packing houses of Chicago slaughter and dress twenty hogs per minute. The division of labor is carried so far that each workman does only one thing and consequently becomes very skilful in his work.

By the use of ice, ammonia or brine (See REFRIGERATION), the cooling rooms are kept at a temperature a little above freezing. Here the meat remains until the animal heat is entirely removed. Pork requires about three days for cooling, and after that time it is ready for the finishing processes. Beef, however, remains in the cooler at least eight or ten days before it is ready for the market, if it is to be sold as fresh meat, and some of the choicest cuts are kept for two or three weeks. This is to allow the meat not only to cool, but to become tender, as well. The process is known as "ripening." Beef that is to be shipped in refrigerator cars is usually loaded after three days, because it can be kept as cool in the car as in the packing house.

PRODUCTS. The different preparations of beef, pork and mutton are too numerous to mention. They may be classed as fresh meats, salt meats, smoked meats, lard, tallow and special preparations, such as canned meats, dried beef and sausage. Each class includes a great variety, but the pork products are far more numerous than the others. After the head is taken off the hog, the sides are cut into ham, side, shoulder, loin and spare rib, if the meat is to be used in this country. If designed for export, it is cut to suit the custom of the country to which it is sent. With us, the loin and spare rib are sold as fresh meat, the hams and shoulder are pickled and smoked, the sides and backs are dry salted or pickled for salt pork and bacon, and the head and trimmings are made into sausage.

SHIPPING. Large quantities of beef, pork and prepared meats are shipped to distant cities and to foreign countries. Prepared meats are shipped in casks, cases and cans, but all fresh meat is transported in refrigerator cars or refrigerator ships. So perfect are these refrigerators that beef shipped from Chicago to Liverpool or any other European port arrives at its destination in a perfect state of preservation.

GOVERNMENT INSPECTION. Before slaughtering, all animals are examined by government inspectors, and any that are diseased or injured are rejected. After slaughtering, all meat is inspected, since some diseases which may escape detection in the live animal are detected in the meat. This rigid inspection is an assurance that all meat that is allowed to be placed on the market is perfectly wholesome. Following exposures of unsanitary conditions and methods in certain departments of the packing business in 1906, Congress passed a law providing for a more strict inspection of meats at government expense.

BY-PRODUCTS. In no industry is there less waste than in meat packing. Everything about the animal is used. The hides are made into leather; glue, soap and oils are made from the hoofs and other parts that are not suitable for meat; the intestines are made into "skins" for packing sausages; the blood and offal are converted into fertilizer; combs, knife handles and buttons are made from the horns and hoofs; the hair of cattle, the wool of sheep and the bristles of hogs are of value in the manufacture of numerous articles. The value of hogs' bristles exported each year is over two million

dollars, and this is one of the smallest items among the by-products.

The United States produces more meat than any other country, the quantity being about one-third of the world's supply. The average number of animals slaughtered each year is five million five hundred thousand cattle, nine million sheep and thirty million hogs. Chicago is the great center of the industry and prepares nearly two-fifths of the meat produced in the country. See **BACON; BEEF; BEEF, EXTRACT OF; LARD; MUTTON; PORK; SAUSAGE; TALLOW.**

Mec'ca or **Mek'ka**, a city of Arabia, about 60 mi. from Jidda, its port on the Red Sea. As the birthplace of Mohammed, it is the holiest city of the Mohammedan world. It stands in a narrow, sandy valley and contains the great mosque enclosing the Kaaba. The city, at the time of the Hajj, or annual pilgrimage to the Kaaba, enjoined by Mohammed on all his followers, is filled with pilgrims, who increase the population from fifty thousand to nearly two hundred thousand. This pilgrimage is the only source of wealth and occupation to the inhabitants of Mecca.

Mechanical, *me kan'ik al*, **Pow'ers**, the simple machines or the elements of which every machine, however complicated, must be constructed; they are the lever, the wheel and axle, the pulley, the inclined plane, the wedge and the screw. Each of these is described under its title.

Mechanics, the term originally used to denote the general principles involved in the construction of machinery. Later the term became separated from all direct connection with practical applications, and it now deals entirely with abstract questions in which the laws of force and motion are involved. In this sense, mechanics is usually divided into *dynamics*, which treats of moving bodies and the forces which produce their motion, and *statics*, which treats of forces compelling bodies to remain at rest. See **DYNAMICS**.

Mechanics' Lien. See **LIEN**.

Mechanicville, N. Y., a village of Saratoga co., on the Hudson River and the Champlain Canal and on the Delaware & Hudson and the Boston & Maine railways, 19 mi. n. of Albany. The water power is abundant, and there are manufactures of woodwork, paper boxes and knit goods. Population in 1905, 5877.

Mechanicsville, **BATTLE OF**, a battle fought at Mechanicsville, 7 mi. from Richmond, Va., June 26, 1862, between a Federal force of about

3,400, commanded by General Fitzjohn Porter, and a Confederate force of 10,000, under the personal direction of General Robert E. Lee. The Federals were in a strong position and compelled the Confederates to open the engagement. Two attacks were repulsed, but on the morning of June 27, upon the arrival of General Stonewall Jackson with Confederate reinforcements, General Porter retreated to a stronger position at Gaines's Mill. The loss of the Confederates was about 2000, and that of the Federals, about 360. The battle opened the so-called "Seven Days' Battles" of the Peninsula Campaign.

Mechlin, *meK'lin*, or **Malines**, *mah leen'*, a town of Belgium, on the Dyle, 14 mi. s. s. e. of Antwerp. Its principal buildings are its cathedral, an ancient Gothic structure which contains an altar piece by Van Dyck; the Church of Notre Dame, the Church of Saint John and the archbishop's palace. The manufactures consist of the famous Mechlin lace, felt and straw hats and woolen stuffs and tapestries. Population in 1904, 58,101.

Mecklenburg Declaration of Independence, a set of resolutions said to have been adopted by a convention of delegates at Charlotte, Mecklenburg Co., N. C., May 20, 1775. The phraseology of the resolutions is very similar to that of the Declaration of Independence of the Continental Congress, and it thus led to a long discussion as to the originality of Jefferson's document. The weight of historical evidence is now opposed to the claim that these resolutions formed the basis of the Declaration of Independence of 1776.

Mede'a, in Greek mythology, daughter of Aetes, king of Colchis, on the eastern coast of the Black Sea. After helping Jason to obtain the Golden Fleece, she fled with him, and to retard her father in his pursuit of them, she is said to have killed her young brother, Absyrtus, whom she had carried away with her, and to have scattered his limbs on the sea. On arriving with Jason in Thessaly, Medea, through her sorceries, put to death Pelias, Jason's uncle, who had kept him from his kingdom, and together they reigned for years. When Jason, however, deserted Medea for Glauce, the sorceress sent to her rival a poisoned robe, which caused her death, and afterward Medea put to death her own children. She then, in her dragon car, mounted into the air and disappeared.

Medellin, *ma da lyeen'*, a city of Colombia, capital of Antioquia department, 40 mi. s. e. of

Antioquia. It is chiefly noteworthy as the center of the gold-mining industry of the province. Population, about 40,000

Med'ford, MASS., a city in Middlesex co., 5 mi. n. of Boston, on the Mystic River and on the Boston & Maine railroad. It is the seat of Tufts College and is a popular residence suburb of Boston. The city has several buildings that are historically interesting, among which is the Cradock House, built in 1634, supposed to be the oldest intact structure in the United States. The industrial establishments include carriage works, brickyards, and manufactures of machinery, chemicals and other articles. The place was settled in 1630 and was chartered as a city in 1892. Population in 1905, including several villages, 19,686.

Me'dia, an ancient country in western Asia, formerly the seat of a powerful kingdom. It was bounded on the n. by the Caspian Sea, on the e. by Parthia, on the s. by Persia and on the w. by Assyria. The Medians were conquered by Assyria at an early date and assisted in the later conquests of the Assyrians. In 625, however, together with the Babylonians, they revolted, under the leadership of Cyaxeres, and while they were absent at the siege of Nineveh, the Scythians invaded Media. Not until more than twenty years later were they able to drive out the Scythians, but when they again turned their attention to the conquest of Assyria, they were successful, and that empire was divided between the Medes and Babylonians. Under Astyages Media gained control over Persia, but Cyrus the Great in 558 conquered Media and established the Medo-Persian Empire. See ASSYRIA; PERSIA.

Med'ical Ju'rispru'dence, also called Forensic Medicine, brings medical science to bear on legal questions, in determining criminal and civil responsibility. It has regard, mainly, either to civil rights or to injuries to the person. Among subjects in its province are those connected with birth, murder, natural death, insanity, monstrosity, accidental or intentional injuries and the action of drugs. In the courts of the United States either side of a case may hire its own experts, but in other countries the practice is regulated so that not often do opposing experts contradict themselves.

Medical Schools, institutions established for the purpose of giving professional training to physicians and surgeons. The first medical school of which we have any record was established at Salerno in the tenth century. When

the great universities of Europe were established, medical schools became departments of them. This custom was introduced into England, and it has now become common in the universities and large colleges of the United States. The first medical school in the United States was the Medical College of Philadelphia, organized in 1765, now the medical department of the University of Pennsylvania. The next one was in connection with King's College, now Columbia University, New York. After the Revolutionary War a number of important schools were established, the most noted being the medical school of Harvard and the medical college at Dartmouth. With the increase in population and consequent demand for physicians, the number of medical schools has increased from time to time, until now there are more than 150 in the United States.

At first, the courses of study were elementary and standards for admission were very low. These standards have been gradually raised, until the best medical schools require graduation from college or its equivalent for admission, and a three or four years' course before granting the medical diploma. The medical schools of universities and other large colleges are all open to women, and there is one institution, the Women's Medical College at Philadelphia, devoted entirely to the instruction of women who wish to become physicians.

Medici, *ma'de che*, a Florentine family which rose to wealth and influence by successful commercial ventures and which continued to combine the career of merchants and bankers with the exercise of political power and a liberal patronage of literature and art. The most famous of the family was Lorenzo de' Medici, called the Magnificent (1449-1492). By his munificence he made himself popular with all classes in Florence and attained the position of an absolute ruler. He encouraged learning and the arts in the most liberal manner; he founded academies and had collections made of books and art relics. The popes Leo X, Leo XI and Clement VII, Catharine, the wife of Henry II of France, and Marie, wife of Henry IV of France, were of the Medici family.

Medicine, *med'i sin*, the science which investigates diseases and the art of preventing, healing or alleviating them. It deals with the facts of disease, with the remedies appropriate to various diseases, with the results of accident or injury to the human body, with the causes that affect the origin and spread of diseases and

with the general laws that regulate the health of individuals and the health of communities. It is broadly divided into two great sections, *surgery* and *medicine* proper. The diseases affecting the outer frame, or those parts of the body visible to the eye, are given to the care of the surgeon, while those that affect the internal organs belong to the province of the physician. There are departments dealing with the diseases of women and children and other departments dealing with the special organs, such as those relating to diseases of the eye, of the ear, of the throat and of the skin. Each department occupies its own domain and is represented by highly trained specialists. The treatment of the insane, as it is concerned with nervous diseases and correlated states of other organs, is an integral part of medical practice. War also has given rise to special developments of medical and surgical science, namely, military hygiene and military surgery; and the administration of the law has created a special branch, medical jurisprudence, or forensic medicine.

At first all diseases were attributed to supernatural causes and the direct influence of unseen beings, and it was believed that they had to be exorcised by ceremonies and prayers. In course of time it was recognized that diseases arose from natural causes; but at the same time each disease was held to be a principle distinct from its effects, and each disease was supposed to have a special remedy—something that would actually cure the disease. Such views led to the adoption of various systems of treatment. For instance, one school held that only vegetable remedies were appropriate to the treatment of diseases; another school upheld the virtues of the bath in one or other of its forms as a universal panacea for all human ills (See HYDROTHERAPY). A third maintained the application of the principle that similars are cured by similars, that is to say, diseases are cured by substances having, in small doses, an action on the body similar to that of the disease, so that one might treat diseases by a series of fixed and specific formulae, all depending on this single principle (See HOMEOPATHY). Finally, there is a strong disposition to attribute success of treatment to particular drugs and to act on the principle that diseases are cured by contraries, that is, by remedies having an action on the body the reverse of that of the disease (See OSTEOPATHY). All these opinions depend on a mistaken view of disease. Anything that interferes with the free and healthy action of any part of the body produces a state of disease, and

the symptoms of the disturbance manifest the disease. For instance, many diseases are caused by the entrance into the body of living germs, which grow and multiply in the blood and tissues and interfere with the various organs. These germs are, however, not the disease, but the cause of the disease (See GERM THEORY OF DISEASE). Again, many diseases are due not to something that has entered the body, but to a breaking down of a certain part of the system. It is clear, therefore, that no specific remedies can be applied to such diseases. The object of the physician is to restore as far as possible the conditions of healthy action, to remove, if he can, the causes of the disease, to relieve pain and to control symptoms so as to direct them toward recovery.

The chief departments of medical science may be given as follows: The science of health is called *hygiene*, or, as far as it relates to the regulation of the diet, *dietetics*. *Pathology* is the science of disease, treating of its nature, origin and progress. *Nosology* treats of the various kinds of diseases, their origin and symptoms, and strives to arrange diseases according to a scientific classification. *Pathological anatomy* deals with the mechanical alterations and changes of structure. *Therapeutics* is the science of the cure of diseases, often divided into *general*, treating of the subject of cure in general, and *special*, of the cures of separate diseases. See DIETETICS; HYGIENE; SURGERY; and numerous articles on special diseases.

Medill', JOSEPH (1823-1899), an American journalist born in New Brunswick, Canada. When eight years old he removed with his parents to Massillon, Ohio. He studied law and was admitted to the bar at Canton in 1846. Three years later he became a journalist and was connected with the management of the *Coshocton Republican*, a Free-Soil paper; the *Cleveland Forest City*, a Whig paper, and the *Free Democrat*, independent. He was actively engaged in the organization of the Republican party in Ohio, and in 1856 with two others he bought the *Chicago Tribune*, which became one of the principal Republican organs of the West. In 1872 he was elected mayor of Chicago, and two years later he became chief proprietor and editor in chief of the *Tribune*, retaining this position until his death.

Medi'na, a city in Arabia, 248 mi. n. by w. of Mecca. It is a holy city; the mosque of the Prophet, which is the most important

building of the city, contains the tomb of Mohammed. Though the pilgrimage to the tomb is not considered by Mohammedans as an imperative duty, yet it is estimated that one-third of the Mecca pilgrims go on to Medina. None except Mohammedans may enter the city. Population, about 48,000. (See HEGIRA.)

Medina, N. Y., a village of Orleans co., on Oak Orchard Creek and the Erie Canal and on the New York Central & Hudson River railroad, 41 mi. w. of Rochester. The creek furnishes abundant water power, which generates the electricity for the town and serves for industrial purposes. Furniture, pumps, hardware, cigars and vinegar are manufactured. The town was settled about 1830 and was incorporated two years later. Population in 1905, 5114.

Med'iterra'nean Sea, the great inland sea which is almost completely enclosed by Europe, Asia and Africa. Its length is about 2300 miles, its greatest breadth, 1080 miles. It communicates on the west with the Atlantic Ocean by the Strait of Gibraltar, and on the northeast with the Black Sea through the Sea of Marmora, the Dardanelles and the Bosphorus. It is very irregular in shape and is divided by Italy and Sicily into two distinct and not very unequal portions. The important subdivisions are the Adriatic Sea, the Tyrrhenian Sea, the Ionian Sea, the Balearic Sea and the Aegean Sea, or Archipelago. The largest and most important islands are Sicily, Sardinia, Corsica, the Balearic Isles, Cyprus, Crete and Malta. The principal rivers which flow directly into the Mediterranean are the Ebro, the Rhone, the Po and the Nile. Owing to the very narrow channel which connects the Mediterranean with the main ocean, there is very little tide, though on parts of the African coast a rise of more than six feet sometimes occurs. The Mediterranean abounds with fish and also furnishes the finest coral and sponges. It is a great highway of traffic.

Medul'la Oblonga'ta, that portion of the brain which lies below the cerebellum and which forms practically the upper end of the spinal cord. It is pyramidal in shape, about an inch long, and contains a large number of important nerve centers, such as the motor and sensory centers of the cranial nerves and those centers which govern respiration, the action of the heart and many of the functions of digestion, secretion and nutrition. Because of this the medulla oblongata is often called the vital

knot, a severe injury to this part of the brain resulting in instant death. The medulla is composed of a series of columns which are continuous with the columns of the spinal cord, and it is connected with the cerebellum and the cerebrum by nerve fibers which extend upward to the various brain centers. See BRAIN; CEREBELLUM; CEREBRUM; NERVOUS SYSTEM, subhead *Cerebro-Spinal System*.

Medu'sae, in classical mythology, one of the Gorgons, the only one who was not immortal. In her youth she was a very beautiful maiden, but having boasted to Minerva of her beauty and power, she was turned into a hideous monster, with brazen claws and teeth and serpents for hair. She was killed by Perseus.

Medu'sae, the name given to certain circular, umbrella-shaped jellyfish, which have acquired their name because of the long trailing feelers, that suggest the snakes on the head of Medusa. The tentacles are armed with stinging cells, which in the common medusae of the Atlantic coast are not strong enough to poison bathers, though in tropical waters they are exceedingly annoying. Scientists give the name medusae to the swimming stage in the development of any animal belonging to the Coelenterata.

Meerschäum, *meer'shawm*, a silicate of magnesium, which occurs as a fine, white, compact clay. Its name is a German word meaning *sea foam* and was applied to this substance because early specimens were found on the seashore in round, white masses, resembling petrified sea foam. It is found in Europe, but is more abundant in Asia Minor. It is manufactured into tobacco pipes.

Meg'aphone. See SPEAKING TRUMPET.

Meg'atherium, a genus of extinct mammals. They were allied to the sloths, but had feet adapted for walking on the ground. Their remains are found in the upper Tertiary or pampas deposits of South America. The megatherium was about eight feet high and from twelve to eighteen feet long. Its fore feet, about a yard in length and armed with gigantic claws, show that roots constituted its chief food.

Mehemet Ali, *ma'he met ah'le*, (1769-1849), viceroy of Egypt. He entered the Turkish army, became successively pasha of Cairo, of Alexandria and of all Egypt. In order to put down a revolt of the Mamelukes, he massacred them in great numbers. He then commenced, by the orders of the porte, a war of

six years' duration in Arabia, which was brought to a successful conclusion by his son Ibrahim. From 1824 to 1827 he assisted the sultan in endeavoring to reduce the Morea, which led to the destruction of his fleet by the allied European powers at Navarino. Subsequently he turned his arms against the sultan, and in his efforts to secure dominion over Syria by armed invasion, he was so far successful that the European powers had to interfere and compel him to sign a treaty which gave him the hereditary pashalic of Egypt, but compelled his submission to the Turkish government.

Mei-nam, *ma nahm'*. See ME-NAM.

Meissonier, *ma so nyay'*. JEAN LOUIS ERNEST (1815-1891), a French painter of historical subjects, born in Lyons. He first became known as an illustrator of books, but rapidly became famous for the singular perfection of his art. His pictures, which are almost without exception upon a small scale, are characterized by great minuteness of execution and by high finish, but are at the same time not less remarkable for their excellence in composition and breadth of treatment. His pictures have been sold for enormous sums. Among them are *The Smoker*, *Napoleon III at Solferino*, *The Cavalry Charge* and the picture entitled "1807."

Meistersingers, *mise'tur sing'urz*. See MASTERSINGERS.

Mek'ka. See MECCA.

Mekong, *ma kong'*, **River** or **Cambo'dia River**, a large river of southeastern Asia, which rises in Tibet, flows through part of China, Siam, Cambodia and French Cochinchina, and enters the Chinese Sea by several mouths. Its length is about 2600 miles, but it is navigable for large vessels for only about 200 miles from its mouth.

Melancholia, *mel'an ko'le ah*. See INSANITY.

Melanchthon, *ma lank' thon*, PHILIP (1497-1560), a German reformer, born at Bretten, in Baden. While professor of Greek at Wittenberg, he met Luther, with whom he became associated in the work of spreading the new religious movement (See LUTHER, MARTIN; REFORMATION). Melanchthon was quiet and studious, quite the opposite of Luther, and often influenced the latter to adopt more moderate views. Because of his mild disposition, Melanchthon was able to settle peaceably many differences between the Protestants and the Catholics and to do much for the cause of the Reformation. He is the author of the *Augs-*

burg Confession, which is the standard of faith for the Lutheran Church, although much altered at the present time. His works include a Greek and Latin grammar, biblical commentaries, theological and ethical works.

Mel'ba, NELLIE (1865–), an Australian soprano vocalist. She was educated in Europe and made her début at Brussels in 1887. Her first appearance in America was at New York in 1893, as "Lucia," and her remarkably clear, rich and sympathetic voice won immediate recognition. After that time she was considered in the front rank of operatic sopranos.

Melbourne, *mel'burn*, a city of Australia, capital of Victoria, on the Yarra, about 8 mi. from its mouth. It occupies an extensive area, which is mostly hilly and undulating, with the Yarra winding through it. The principal streets are wide and well paved and are lined with handsome and substantial edifices. Among the most noteworthy of the public buildings are the houses of parliament, the treasury, the law courts, the free library, the mint, the university and the theaters. There are several public parks, a finely laid-out botanical garden and a splendid race course. The shipping trade is large, and Melbourne is the most important commercial town of the Southern Hemisphere. The chief exports are gold, wool, hides and leather, cereals and flour, and the chief imports are manufactured goods. Most imports are subject to a heavy duty. By its railway systems, Melbourne is connected with all the principal towns of the Australian continent. Melbourne was founded and named in 1837 and was incorporated in 1842. A Centennial International Exhibition was held there in 1888, in celebration of the founding, in 1788, of the Australian colonies. Population of the city proper in 1901, 68,853; inclusive of suburbs, 490,896.

Melbourne, WILLIAM LAMB, Viscount (1779–1848), an English statesman. He succeeded to the premiership in July, 1834, was dismissed in November, but was recalled in the following year. When Queen Victoria came to the throne, it was Melbourne to whom she looked for instruction as to her duties. From 1841 to his death Melbourne took little part in public life.

Meleager, *mel'e a'jur*, in Greek mythology, a hero distinguished for his part in the Argonautic expedition, and particularly for his share in the Calydonian hunt. He killed the boar and gave its skin as the highest token of regard to his beloved Atalanta.

Mel'ilot, the common name of a group of plants belonging to the Pulse family, also called sweet clover. These plants resemble alfalfa, having three-lobed leaves and small white or yellow flowers. They have a sweet odor, especially when drying. The yellow melilot grows to a height of three or four feet and is found in damp places. The flowers are used in the manufacture of perfume. This has become a troublesome weed in some districts, owing to its great abundance in pasture land. Increased cultivation of the soil and fertilization will usually prevent its spread.

Mel'len, CHARLES SANGER (1851–), an American capitalist and railway manager, born at Lowell, Mass. He entered the service of railways in 1869, rising gradually until he became general traffic manager of the Union Pacific system in 1889. Three years later he was made general manager of the New York & New England railroad, later president of the Northern Pacific railway and in 1903 president of the New Haven & Hartford railroad company, one of the most important lines of the New York Central system.

Melo'deon. See ORGAN.

Melodrama, *mel o drah'ma*, originally and strictly, that species of drama in which the declamation of certain passages is interrupted by music. The term has now come to designate a romantic play, generally of a serious character, in which effect is sought by startling incidents, striking situations and exaggerated sentiment, aided often by splendid decoration and music.

Melody, in the most general sense of the word, any succession or series of tones; in a narrower sense, a series of tones which please the ear by their succession and variety; in a still narrower sense, the predominant air or tune of a musical piece.

Mel'on, a well-known fruit of a climbing or trailing annual plant. There are numerous varieties cultivated in all parts of the world. *Muskmelon* (often heard as *mushmelon*), *cantaloupe* and *nutmeg* are names given to different varieties that have been produced by cultivation from one species whose origin no one knows with any certainty. In England the word melon is confined exclusively to this one fruit, but in the United States the word is as frequently applied to the fruit of a very different vine, known as the *watermelon*, which grows in most warm countries and in several states is a large and important crop.

Me'los or **Mi'lo**, an island belonging to Greece, in the Grecian Archipelago, in the southeastern part of the Gulf of Aegina. It is one of the Cyclades, and its area is about 60 square miles. Near the site of the ancient town of Melos is a modern town, Plaka. In 1820 a peasant discovered on the island of Melos the celebrated Venus of Milo, which is now in the Louvre, Paris. Population of the island, 5310.

Melpom'ene, the muse who presides over tragedy. She is generally represented as a young woman, wreathed with vine leaves and holding in her hand a tragic mask.

Mel'rose, MASS., a city in Middlesex co., 7 mi. n. of Boston, on the Boston & Maine railroad. It is a residence suburb of Boston and also contains manufactures of rubber boots and shoes and other articles. The city has a free library and a public park. Other features of interest are the Middlesex Fells, a state reservation of 1800 acres, and Spot Pond, a large national reservoir. The place was settled about 1632, was made a separate municipality in 1650 and was chartered as a city in 1900. Population in 1905, including several villages, 14,295.

Mel'ville Island, an island in the Polar Sea, n. of America. Captain Parry discovered it in 1819.

Melville Peninsula, a peninsula of the northern coast of North America, n. of Hudson Bay. It forms part of the Canadian territory of Keewatin. Boothia Gulf bounds it on the west, Fury and Hecla Strait on the north, and Fox Channel on the east.

Membranes, *mem'braynz*, those tissues of the body which are arranged in layers. They are found covering organs, forming the walls of tubes and lining cavities. The principal classes are *serous*, *mucous* and *fibrous*. Serous membranes, as the pleura, pericardium and peritoneum, form a sort of closed sac surrounding certain organs and secrete a small quantity of serous fluid, which allows free action to the organs. These membranes are liable to various diseases, as inflammation, diseased growths and hemorrhage. Serous membranes which line the cavities of joints and the sheaths of tendons and ligaments are called synovial membranes. Mucous membranes line all cavities by which matter is taken into the body or expelled from it, as well as all that communicate with the external air, as the digestive apparatus and air passages. These membranes have a soft, velvety surface and secrete such a fluid as best

serves the organs they line. Fibrous membranes include the periosteum, covering the bones, the dura mater, covering the spinal cord and brain, and the membrane found in many glands.

Memel, *ma'mel*. See NIEMEN.

Mem'ling, HANS (1430?-1494), one of the greatest of early Flemish painters. In his study he became a pupil of Van der Weyden, whom he surpassed. The figures of women in his pictures are especially attractive and are noted for the beauty and refinement of their faces. He is also noted for the detail and accuracy of his drawings. Many of his paintings are in Bruges, where he lived. His *Virgin and Infant Jesus* and *Marriage of Saint Catherine* are in the Louvre, Paris. Other works are *The Madonna and Infant Christ Enthroned*, *Saint Lawrence* and *Saint John the Baptist*, and *Saint Christopher and the Infant Christ*.

Memminger, *mem'min jur*, CHRISTOPHER GUSTAVUS (1803-1888), an American politician, born in Württemberg, Germany. He was taken in infancy to South Carolina, where he was placed temporarily in an orphan asylum, but he was later adopted into the family of a wealthy and influential planter. He graduated from South Carolina College in 1820, studied law and began practice in Charleston. He was elected many times to the state legislature and always vigorously opposed John C. Calhoun. After the election of Lincoln he was prominent in the secession movement in South Carolina and became secretary of the treasury in the newly formed Confederacy. He resigned in June, 1864.

Mem'non, a king of the Ethiopians, mentioned in the Homeric poems as coming to the aid of Troy against the Greeks. He slew Antilochus, but was himself slain by Achilles. The name of Memnon was latterly given to a statue still standing at Thebes, in Egypt, which was one of two known from their size as the *Colossi*. This statue, known as "the vocal Memnon," was celebrated in antiquity as emitting a sound every morning at the rising of the sun.

Memo'rial Day. See DECORATION DAY.

Mem'ory, the power of mind by which we retain, recall and re-know mental experiences. A complete act of memory has three phases, usually known as retention, recollection and recognition. If any one of these is missing, the act is of little or no value. Memory is the result of a fundamental law of the nervous system, namely, a tendency of the nerves to act

again in the manner in which they have already acted (See HABIT). Memory is not a distinct intellectual power, with a special site or special center in the brain, as formerly supposed. It has a physical as well as an intellectual basis, and as many centers as there are avenues of knowledge. Each sense, each mental power, each train of thought and feeling has its memory.

LAWS OF MEMORY. Ideas in the mind are recalled to consciousness according to two methods of association, namely, by contiguity, or simultaneity, and by similarity. See ASSOCIATION OF IDEAS.

The Law of Contiguity. According to this law, ideas are recalled according to their association in time and place. Ideas which accompany each other in close succession are usually reproduced in the order of their occurrence. A child soon learns that fire is accompanied by heat, and the idea of one will recall the idea of the other. The idea of a part suggests the idea of the whole, as a boiler suggests an engine; a wheel, a wagon; a leaf, a tree. The order of sequence is important under this law. We recall with less effort those ideas which occur in the order of logical connection or in the order in which we are accustomed to associate them. One will recall the letters in the alphabet in the order of a, b, c, with little or no effort, but if he attempts to recall them in any other order, a serious effort is necessary. This law of memory closely associates memory with reason and embodies the relation of cause to effect, as lightning suggests thunder; a tree in blossom, the fruit. Conversely, effects suggest causes, as the eating of the fruit may suggest the tree in blossom.

Law of Similarity. According to this law, similar ideas tend to recall each other. A stranger may recall a friend because he resembles him in appearance. One river recalls another; one journey, another, and so on. The law of similarity has a less extensive application than the law of contiguity; yet it is important, because it enables many ideas to be reproduced which cannot be recalled by the law of contiguity. Ideas reproduced by similarity do not necessarily occur simultaneously in time and place.

The primary laws of memory are modified by so-called secondary laws. The most important of these are:

Clearness of Knowledge. Ideas cannot be reproduced unless they are retained, and it naturally follows that one recalls more readily

the ideas which he has most completely apprehended. Therefore, every possible power of the mind should be brought to bear upon the acquisition of a new idea.

Repetition. Other things being equal, those ideas which are most frequently present in consciousness are the most readily recalled. Repetition tends to strengthen the idea and also to establish the habit of its recall.

Degree of Feeling. The feeling attending the experience of an idea may be either pleasurable or painful, and the greater the degree of this feeling the more easily is the subject recalled. Some ideas are acquired under conditions which give rise to very strong emotions and are recalled with an extraordinary degree of vividness. Severe accidents, great calamities, the death of a friend, are ideas of this sort.

Interest. Interest is a strong factor in determining the association of ideas, and a person most readily recalls those experiences which have the most significance to him or which he feels appeal most vitally to his needs. See INTEREST.

Inherent Mental Tendencies. Some are naturally interested in one subject, and others in another. For this reason two people viewing the same scene will obtain different mental pictures of it and consequently recall different images. These tendencies begin to appear early in life, and unless carefully guarded they are liable to lead to one-sided development.

KINDS OF MEMORY. Psychologists frequently recognize two kinds of memory, based upon the two primary laws of association. The memory based upon the law of contiguity is usually known as a logical, or thinking, memory. The careful culture of this memory leads one to associate cause and effect and to depend more upon his powers of reasoning and judgment for arriving at conclusions than upon his ability to recall ideas mechanically. The memory based upon the law of similarity is more of a mechanical memory and tends to arrange ideas in series and then recall them in a certain order, whether or not this order is logical. Many illustrations of this sort of memory are found among school children, such as committing the multiplication table, regardless of the process by which the results are obtained; the memorizing of the rules in arithmetic, grammar and other subjects without a knowledge of their meaning or ability to apply them. Because the mechanical memory is abused, it is often considered an evil, yet it is necessary to the complete development of the memory, and when

properly guarded it is a source of mental strength.

CULTIVATION OF MEMORY. Memory is one of the most important of the mental powers. Without it, it would be impossible to retain knowledge and one would be unable to profit by his experiences. Memory develops early in life, and through childhood and youth it should receive careful attention. Its cultivation can be assisted by adhering to the following principles:

(1) Memory depends upon sensation, perception and thinking. Unless these powers are properly developed, memory will be defective. See **SENSATION**; **PERCEPTION**; **CONCEPT**.

(2) The order of the processes in the acquisition of an idea is as follows: (a) Observation; (b) thought (forming concepts); (c) application. In cultivating the memory, these three phases of its use should be carefully considered. Like every other power, memory is strengthened by use, and unless children are required to reproduce their ideas they never form the habit of doing this easily and correctly.

(3) Memorizing selections may be either beneficial or injurious, according to the method employed. If the law of acquisition of ideas is followed and the child understands what is memorized, such exercises are beneficial in strengthening the memory, but if to any extent he is allowed to memorize meaningless words or words which he cannot properly understand and pronounce, he soon acquires the habit of doing this work carelessly and is unable to recall the ideas correctly.

(4) Habits of reading become means of weakening or strengthening the memory. When one reads without thought, the effect upon the memory is injurious; but if he reads thoughtfully, with the purpose of retaining the ideas, and then follows the reading by the reproduction of those ideas, the memory is strengthened. For this reason requiring children to reproduce their exercises in school, either orally or in writing, is a valuable training.

(5) All school subjects are valuable for memory training, but arithmetic, literature, history and drawing, when properly taught, are the best, because they appeal to the powers of observation and to the thought power.

(6) Memory is aided by repetition. If the repetition is so planned that the mental process is not different from the original act of learning, it is a great aid to the memory. Teachers in planning reviews should bear this principle in mind. The review should enable the pupils to

recall the subjects in the order in which the different topics were learned, and it should never contain more than the mind can grasp and hold at one time.

(7) The memory image, however vivid, is always fainter than the original; therefore, care should be taken to see that the child obtains as clear and complete ideas as possible. See **PERCEPTION**.

(8) Childhood is the age for developing and strengthening the memory. During the school life of the child it is well for him to memorize some things which he does not fully understand, because as the reasoning powers develop and he extends his field of knowledge, these subjects will be fully apprehended.

(9) The mechanical memory is essential to the child and in some cases to the adult. The danger in its use lies in the liability to rely upon it after the logical memory should take its place.

See **PSYCHOLOGY**; **METHODS OF TEACHING**. Consult Dorpfield's *Thought and Memory*; Halleck's *Psychology and Psychic Culture*, and Salisbury's *The Theory of Teaching*.

Memphis, *mem'fis*, an ancient city of Egypt, on the west bank of the Nile, about 12 mi. s. by w. of Cairo. It is said to have been founded by Menes, the first king of Egypt. It was a large and splendid city and after the fall of Thebes was the capital of Egypt. The pyramids and tombs of Sakkara and the colossal statue of Rameses II are the chief objects of interest on the site.

Memphis, **TENN.**, a city and the county-seat of Shelby co., on the Mississippi River, 209 mi. w. s. w. of Nashville, on the Illinois Central, the Louisville & Nashville, the Saint Louis & San Francisco, the Chicago, Rock Island & Pacific, the Southern and several other railroads. It is situated on a bluff 40 feet above high water. Among the principal buildings are the United States customhouse, the Cotton Exchange, Cossett Library, Memphis Hospital Medical College, Lyceum theater, the Grand Opera House, the Auditorium and numerous fine office buildings. The city contains a marine hospital and several other large hospitals, and among its educational institutions are Christian Brothers' College, Hannibal Medical College, Le Moyne Normal Institute and several other schools. Memphis has several beautiful parks, containing, all told, more than 1000 acres. Its streets are shaded and well paved and are lined with beautiful homes and substantial business blocks, which emphasize the city's prosperity and prog-

ress. The facilities for transportation and the excellent location of Memphis have made it one of the chief commercial cities of the South. It is the most important cotton market in the interior of the United States. Its cottonseed oil industry is also important, as well as the trade in groceries, dry goods, shoes, hardware and agricultural implements. There are immense wood-working establishments, large foundries, machine shops, furniture factories, flour mills, clothing factories, brick and tile plants and tobacco factories. The Mississippi River is crossed here by a magnificent iron bridge, built in 1892. The first settlement in Memphis was made in 1819. In 1826 it was incorporated as a town, and in 1849 it was chartered as a city. Population in 1900, 102,320.

Memphremagog, *mem'fre ma'gog*, a lake which is situated partly in Vermont and partly in the Province of Quebec, Canada. Its length is about 35 miles, its width from 2 to 5 miles. Its waters are discharged through the Magog River into the Saint Francis River in Canada. The lake, on account of its picturesque scenery, is much visited by tourists, and many beautiful summer resorts are located on its banks.

Menai, *men'i*, **Strait**, the channel between the island of Anglesey and the mainland of Wales. It is about 13 miles long and its width varies from one-fourth of a mile to two miles. The navigation of the strait is extremely difficult. The strait is spanned by a suspension bridge and by the Britannia tubular bridge.

Menam, *ma nahm'*, or **Mei-Nam**, the chief river of Siam. It rises in the Shan Mountains, flows in a generally southern direction and enters the Gulf of Siam below Bangkok. Its length is about 750 miles, but it is navigable by large vessels only as far as Bangkok.

Menash'a, Wis., a city in Winnebago co., 88 mi. n. by w. of Milwaukee, on Lake Winnebago at its outlet into the Fox River, on the canal between the Fox and Wisconsin rivers and on the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul and the Wisconsin Central railroads. Like other places on the lake, it is a popular summer resort. It has a public library and contains woodenware mills, paper mills, machine shops, flour, lumber and woolen mills, brickyards and other establishments. The place was settled in 1847 and was incorporated in 1874. Population in 1905, 5960.

Mendaña, *main dah'nya*, **Islands**. See MARQUESAS ISLANDS.

Mendelssohn-Bartholdy, *men'del sone bahr-tole'dy*, FELIX (1809-1847), a distinguished composer, born at Hamburg. In his ninth year he publicly appeared in Berlin, and in his sixteenth year he produced the well-known overture to the *Midsummer Night's Dream*. In 1829 he began an extensive tour through England, Scotland, France and Italy, and on his return to Germany he became musical director in Düsseldorf. In 1835 he was chosen conductor of the famous concerts in the Gewandhaus of Leipzig and later received several royal appointments, which made the last years of his brief life a continuous triumph. His works are delicate and melodious, but somewhat superficial. The best are *Songs Without Words*, the oratorios *Saint Paul* and *Elijah*, the *Midsummer Night's Dream* overture and the cantata to Goethe's *First Walpurgis Night*.

Mendoza, *men do'sa*, the capital of the Province of Mendoza, in Argentina, at the eastern base of the Andes, 160 mi. e. of Valparaiso. It is a well-built city, with a college, normal schools, banks and a street railway. It is connected by rail with Buenos Ayres. In 1861 an earthquake destroyed the city and killed about 10,000 people. Population, 28,602.

Men'ela'us, in Greek mythology, the brother of Agamemnon and husband of the beautiful Helen, with whom he received the kingdom of Sparta. His wife was carried off by Paris, son of Priam, king of Troy, and in accordance with a previous oath, the Greek princes joined Menelaus in his effort to avenge the affront. Menelaus himself led sixty ships to the siege of Troy. After its conquest he returned with Helen to his native land in a devious voyage which led him to Cypria, Phoenicia, Egypt and Libya, and thereafter he ruled happily until his death. See HELEN.

Menha'den or **Mossbunker**, an American salt-water fish of the herring family. It abounds on the shores of New England, where it is taken in large quantities and used for fertilizer and as the source of a valuable oil. Since a method for extracting the bones has been discovered, the menhaden has become a valuable food fish and is preserved in the same way as sardines. This remarkable fish is known in different localities by different names; *pogy*, *whitefish*, *bunker*, *fat-back*, *yellow-tail* and *bonny fish* are but a few of them.

Men'no Si'mons (1492-1561), the founder of the sect known as the Mennonites, was born in

Friesland. The Mennonites of the United States number about 56,000. The different branches differ on the ritual, in discipline and in points of doctrine. There are a number of congregations in Holland, Germany and Russia.

Menonites, **THE**, a Protestant sect, founded at Zurich in 1525. The doctrines spread rapidly through Switzerland, Germany and Austria. As a result of persecution, three thousand perished and many went to Moravia and Holland. Menno Simons gave the society its name, through his efforts to counteract the influence of the Anabaptists and to unite those of his own belief. In 1871 many Mennonites came to the United States from Russia, to avoid conscription for the army of the czar, and settled in Minnesota and Kansas. These people refuse to take oaths and to bear arms. They pay much attention to the ordering of their lives on Christian principles and are cultured, honest and charitable.

Menom'inee (wild rice men), a tribe of Indians once occupying northern Wisconsin. Of the remnant, about 1400 now live on a reservation near Green Bay.

Menominee, **MICH.**, the county-seat of Menominee co., 52 mi. n. e. of Green Bay, Wis., on Green Bay at the mouth of the Menominee River, opposite Marinette, Wis., and on the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul and other railroads. The city is a great lumber-shipping port, contains many saw and planing mills and manufactures electrical apparatus, shoes, paper, boilers, machinery and other articles. It has a public library, Saint Joseph's Hospital and a fine high school building. The place was first settled in 1799. Population in 1904, 11,096.

Menom'onie, **Wis.**, the county-seat of Dunn co., situated on the Red Cedar River and on the Chicago, Milwaukee & Saint Paul and the Chicago, Saint Paul, Minneapolis & Omaha railroads, 25 mi. n. w. of Eau Claire and 70 mi. e. of Saint Paul. Its industries consist of large lumber and shingle mills, foundries, machine shops and brickyards. The city is noted for its educational advantages, being the seat of the Stout Training School for the preparation of kindergartners, teachers of manual training and domestic science; also of a county training school which prepares teachers for county schools, and a county school of agriculture and domestic economy. Its public schools give instruction in art, manual training and domestic science in all grades in which the various branches

of the work can be taken with profit. Population in 1905, 5473.

Men'sura'tion, the application of the simpler processes of mathematics to the measurements of lines, surfaces and volumes. Length must be measured by direct comparison with some unit of length. But the area of surfaces may be found without such direct comparison, the number of units of area being equal to the product of the numbers of corresponding units of length in each of the two dimensions of the surface. The area of any parallelogram is equal to the product of the number of units of length in its altitude by the number of units of length in its base. The area of any irregular polygon may be found by dividing it into triangles, the area of each triangle being equal to one-half the product of the number of linear units in its base by the number of linear units in its altitude. The area of a trapezium is equal to half the sum of two opposite sides multiplied by the perpendicular distance between them. The circumference of a circle may be found by multiplying the diameter by π or 3.14159. The area of a circle may be found by multiplying the square of its radius by π or multiplying the radius by one-half the circumference. The volume of any rectangular solid may be found by multiplying the length, width and depth together; that of a cylinder, by multiplying the height by the area of the base; of a cone, by multiplying the height by one-third the area of the base; of a sphere, by multiplying the cube of the radius by $\frac{4}{3} \pi$.

Men'tor, the faithful friend of Ulysses, to whom Ulysses entrusted the care of his domestic affairs during his absence in the war against Troy. The education of the young Telemachus fell to his charge, and the wise and prudent counsel which he gave the youth has made his name the synonym for a wise counselor. See **ULYSSES**.

Mephistopheles, *meff'is tof'e leez*, the name of a demon in the old puppet plays, adopted by Goethe in the first part of *Faust*. Although the name since Goethe's time has been commonly used as a name for the devil, the Mephistopheles of Goethe has few of the characteristics which, in the ordinary belief, belong to Satan.

Merca'tor, **GERARD** (1512-1594), a Flemish geographer, born at Rupelmonde, in Flanders. He is the author of a method of projection used in nautical maps, the principles of which were applied practically by Edward Wright in 1599. He is also the author of *Tabulae Geographicae*.

Merca'tor's Projec'tion. See **MAP**.

Mercer, *mur'sur*, HUGH (1720-1777), an American soldier, born at Aberdeen, Scotland. He served as surgeon in the forces of the pretender Charles Edward in 1745, and at the failure of the rebellion he went to America, settling near the site of the present Mercersburg, Pa. At the outbreak of the Revolution he joined the patriot party and became brigadier general in 1776. He fought with distinction at Trenton and at Princeton, where he was mortally wounded. At Laurel Hill Cemetery, Philadelphia, there is a monument to him.

Merchant Marine, *mur'chant ma reen'*, a collective name for the commercial fleets or shipping of any nation or of the world. Throughout all antiquity and during medieval times, the Mediterranean Sea was the scene of the world's commerce, and the most prominent trading centers were successively Phoenicia, Carthage and Venice. The Belgian cities of Bruges and Antwerp and the German cities of the Hanseatic League controlled the carrying trade of northern Europe until the discoveries and explorations of the fifteenth century brought the Portuguese, Spanish, English, Dutch and French into hearty rivalry with them. In the end, England out-distanced her competitors and has since held the most prominent position in Europe. At the time of the breaking out of the Civil War, the ships of the United States controlled almost as much trade as Great Britain herself, but the war threw our commerce back to such an extent that it has never again reached the same relative importance, although for a number of years it has been rapidly improving. The coastwise trade of the United States is nearly seven times as large as its foreign trade. The position of the merchant marine of the United States is shown by the fact that in the year 1904 the tonnage of Great Britain was fully 17,000,000, while that of the United States was a little more than 6,000,000. The tonnage of Germany was over 3,000,000; of Norway, 1,750,000; of France, practically the same, while that of Italy was a little over 1,000,000. For the year ending June, 1905, the United States vessels entered at domestic ports had a carrying capacity of about 7,000,000 tons, while the capacity of foreign shipping in our ports amounted to 24,000,000 tons. There were in the world in 1903 about 30,000 ships exceeding 100 tons in capacity, but of these the United States had only about 3400 ships, aggregating less than 4,000,000 tons.

Mercier, *mair sya'*, HONORÉ (1840-1894), a Canadian politician, born at Saint Athanase, Quebec. He was educated at Jesuits' College, Montreal, and studied law, but engaged in journalism. He sat in the Dominion parliament from 1872 till 1874, became solicitor general, was a member of the legislative assembly of Quebec in 1879 and became attorney-general and premier in 1887, at the head of a coalition of Liberals and Clericals.

Mercury, *mur'kury*, or **Quick'silver**, a metal, heavier than any other excepting the platinum metals, gold and tungsten, and the only metal which is liquid at ordinary temperatures. At 39° or 40° below the zero of Fahrenheit, it freezes, and under a heat of 660° it rises in fumes and is gradually converted into a red oxide. Mercury is prepared principally from cinnabar (red sulphide of mercury) by heating, combined with condensation of the vapors. Mercury in its metallic form, as well as in its salts, is poisonous, and chronic poisoning is apt to afflict persons who work continuously about the metal. Because of the extensive range between its freezing and its boiling point and because of its fluidity, it is well adapted for use in barometers and thermometers, which allow for its expansibility under heat. Preparations of this metal are among the most powerful poisons and are extensively used as medicine (See CALOMEL; CORROSIVE SUBLIMATE). In its fluid state, mercury combines readily with most of the metals, to which it imparts a degree of fusibility or softness. This quality of combination makes it a useful factor in methods of extracting metals from their ores. An alloy of mercury and any other metal is called an amalgam. Mercury is sometimes found in its fluid state, but usually it occurs as the sulphide. About one-third of the mercury used in the world comes from Spain, but it is also found in Germany Italy China, Borneo, Mexico and Peru. California, Texas and Oregon produce some mercury, the largest supply coming from California.

Mercury, the planet nearest the sun and the smallest of the major planets. Its diameter is about 3000 miles, which makes the planet about three times the size of the moon. Mercury moves round the sun in a little less than 88 of our mean solar days, at a mean distance of about 35,392,000 miles. At its nearest approach to the sun it is about 29,000,000 miles away, and at its farthest point, more than 43,000,000

miles from it. The period of its axial rotation is said to be 24 hours, 5 minutes and 28 seconds. Its volume is about one-seventeenth that of the earth, and its density is one-tenth greater than that of the earth. When farthest east of the sun, it is visible to the naked eye in spring and autumn, after sunset and before sunrise. Mercury is a difficult planet for astronomers to study, and very little is known concerning it. At intervals of from three to thirteen years it is seen to pass across the sun's disk, and this transit is always studied very carefully, for it shows clearly the laws that govern the planet's motion. Nov. 17, 1907, and Nov. 14, 1914, are dates when the transit is visible in Europe and the Eastern United States.

Mercury, in Roman mythology, the son of Jupiter and Maia, and the messenger of the gods; in Greek mythology he is called Hermes. When he was but a few hours old he sprang from the knees of his mother, seized a tortoise shell and stretched strings across it, thus inventing the lyre. Before night he had stolen the oxen of Admetus, which Apollo was tending, and had hidden them so securely that Apollo could not find them. Mercury was obliged to confess where he had concealed the animals, and in return for the two which he had eaten he gave to Apollo his newly invented lyre. Apollo, pleased with the gift, presented Mercury with the caduceus, which became his most characteristic symbol. Jupiter also presented him with a winged cap, winged sandals and a short sword, by means of which he could make himself invisible and could transport himself to any place in the twinkling of an eye. One of Mercury's duties was to conduct the souls of the dead to Hades. He was also the god of thieves and robbers, of commerce and of eloquence. To the Greeks, Mercury was a very important god, and at the crossroads small statues of him were set up, the violation of which was a weighty offense.

Mercy, SISTERS OF, the name given to members of female religious communities founded for the purpose of nursing the sick at their own homes, visiting prisoners, superintending the education of females and performing similar acts of charity and mercy. Communities of Sisters of Mercy are now widely distributed over America and Europe.

Mercy Seat, the cover of the Jews' ark of the covenant. It was made of pure gold and was about forty-five inches long and twenty-seven inches wide. On each side was a cherub

with outstretched wings, a wing of one meeting that of the other. On the great day of atonement the high priest entered the holy of holies, burnt incense, sprinkled the blood of the sacrifice on the mercy seat and made atonement for the sins of the nation and himself.

Mer de Glace, *mair de glas*, the name of the most celebrated glacier of the Alps. It is situated on the northern slope of Mount Blanc and has an area of sixteen square miles and a length of about nine miles. The lower end is known as the Glacier des Blois, whence it flows into the Arveyron River, in the valley of Chamouni. This glacier is easily accessible from the village of Chamouni and consequently is visited by a large number of tourists each season. During the summer and autumn its flow has an average of two feet a day. See GLACIERS.

Mer'edith, GEORGE (1828-), an English poet and novelist. He was born in Hampshire and was educated in Germany. After studying law for a time, he turned to literature, and his first venture was a volume of poems, published in 1851. His first novel, *The Ordeal of Richard Feverel*, was published in 1859, and from that date poems and novels have appeared steadily, although not rapidly. Among the works which have marked Meredith as one of the foremost novelists of the late nineteenth century are *Rhoda Fleming*, *The Adventures of Harry Richmond*, *The Egoist*, *Diana of the Crossways*, and *The Amazing Marriage*.

Mergan'ser, a family of fish ducks with slender, straight bills, hooked at the tip and notched at the edges. The hooded merganser is suitable for food, but the flesh of most of the others is strong, because of their proclivity for eating fish. The *red-breasted merganser* is about two feet long and has no crest. Together with the hooded merganser it is found in nearly all parts of the northern hemisphere.

Merida, *ma're da*, the capital of Yucatan, in Mexico, 26 mi. from the port of Progreso, on the Mexican Gulf, with which it is connected by a railway. It has a Moorish aspect and contains a number of fine squares, a cathedral, a bishop's palace, a government house and good legislative buildings. Population in 1900, 43,630.

Merida, a town of Venezuela, capital of the State of Los Andes. It was once the largest city of Venezuela, but it was destroyed by an earthquake in 1812 and has been only partly rebuilt. It is, however, a flourishing town, with a university and manufactures of various articles. Population, about 12,000.

Mer'iden, CONN., a city in New Haven co., halfway between New Haven and Hartford, on two lines of the New York, New Haven & Hartford railroad. It is a prosperous industrial center and has a picturesque location in an agricultural district, not far from the beautiful Lake Merimere. There are extensive manufactures of silver and plated ware, hardware, cutlery, organs, piano-playing attachments, glassware, machinery and various other articles. The city contains the Curtis Library, Connecticut School for Boys, Curtis Home for Orphan Children and Aged Women and Meriden Hospital. Previous to its incorporation as a town in 1806, it was a part of Wallingford. It was chartered as a city in 1867. Population in 1900, 24,296.

Merid'ian, one of the innumerable imaginary lines passing from pole to pole perpendicular to the equator, on the surface of the earth. They serve to determine the longitude of places and thus to mark their exact position. Every place on the globe has its meridian, and when the sun arrives at this line it is noon, or midday. The longitude of a place is its distance—usually stated in degrees, minutes and seconds—east or west of any meridian selected as a starting point, just as its latitude is its distance north or south of the equator. At a national conference held at Washington, October, 1884, Greenwich was selected as the geographical and astronomical reference meridian of the world, longitude to be reckoned east and west from this, up to 180°. See **LONGITUDE**.

Meridian, Miss., the county-seat of Lauderdale co., 85 mi. e. of Jackson, on the Mobile & Ohio, the Queen & Crescent and the Southern railroads. The city is in a cotton-growing region and has an extensive trade. It contains railroad shops, cotton, cottonseed oil and lumber mills, ice factories and various other works. Here are located the East Mississippi Female College, the Meridian Academy and the Lincoln School. The city was an important supply depot during the Civil War. In 1864 General Sherman destroyed all the railroads in the vicinity and many of the storehouses and residences in the city. Population in 1900, 14,050.

Merimee, *ma re ma'*, PROSPER (1803-1870), a French novelist, dramatist and historian. He filled, in succession, various positions under the French government, was elected to the French Academy and was made commander of the Legion of Honor. Several reports of his researches as inspector of ancient monuments were among his early work; but he is chiefly

known for his *Colomba*, a tale of a Corsican vendetta; *Carmen*, a romance which was the origin of Bizet's popular opera, and several volumes of short stories.

Merino, *mer e'no*. See **SHEEP**.

Merle d'Aubigne, *mairl do be nya'*, JEAN HENRI (1794-1872), a Swiss historian and theologian. His education, begun at Geneva, was completed at Berlin; he became pastor at Hamburg to a French congregation and removed afterward to Brussels. Returning to Geneva in 1831, he became professor of Church history in the theological school founded by the Genevan Evangelical Society. Besides his well-known *History of the Reformation in the Sixteenth Century*, he published a supplementary history to the time of Calvin; *The Protector* (Cromwell), and the *Recollections of a Swiss Minister*.

Merlin, *mur'lin*, a famous ancient British magician and prophet, who, according to Geoffrey of Monmouth, lived in the fifth century. Accounts of him are bound up with the legends about King Arthur, and one of Tennyson's *Idylls of the King* deals with him.

Mer'maid and Mer'man, legendary creatures who lived in the sea, possessed human bodies united to the tails of fishes and were supposed to be capable of entering into social relationships with men and women. The typical mermaid was a lovely creature who combed her long, beautiful hair with one hand while she held a looking-glass with the other. The origin of this myth is supposed to rest in the human-like appearance of certain aquatic animals, such as the seal. The legends of mermaids and mermen have been largely treated in poetry.

Merovingians, *mer o vin'je anz*, the name given to the first dynasty of Frankish kings who ruled in Gaul. The grandfather of Clovis, Merovaeus, is supposed to have given his name to the line. Clovis, the first powerful king of the dynasty, was succeeded by weaker kings, and the royal power came in time to be a name only, the real authority being possessed by the mayors of the palace. Childeric III was deposed in 752 by Pippin the Short, who was the founder of the Carolingian dynasty. See **CAROLINGIANS**.

Mer'ril, Wis., the county-seat of Lincoln co., 170 mi. n. w. of Milwaukee, on the Wisconsin River and on the Chicago, Milwaukee & Saint Paul railroad. The city is in a hard wood lumber district, and lumbering and the manufacturing of lumber products are the principal industries. It contains the Scott Public Library, a large opera house and a fine

courthouse. The place was settled in 1875 and was incorporated in 1880. Population in 1905, 9197.

Mer'rimac, THE. (1) A frigate famous in the Civil War. It was originally a wooden vessel belonging to the Union, but it was sunk in the Norfolk navy yard in 1861 when the place was abandoned to the Confederates. She was reconstructed, by the Confederate authorities as an ironclad, was renamed the *Virginia* and had set out upon a triumphant campaign against the wooden warships of the Federal government when the *Monitor* appeared on the scene. In the battle which followed, the *Merrimac* was not seriously damaged, but in May of the same year, when the Confederates evacuated Norfolk, she was destroyed. See **MONITOR**, THE.

(2) A collier sunk at Santiago de Cuba, June 3, 1898, by Lieutenant Hobson of the United States navy, in a vain attempt to bottle up the Spanish fleet then at anchor in the harbor.

Merrimac River, a river in New Hampshire and Massachusetts. It rises in the White Mountains, flows south, then east, and empties into the Atlantic near Newburyport, Mass. The immense water power furnished by its falls has created the towns of Lowell and Lawrence, Massachusetts, and of Nashua and Manchester, New Hampshire.

Mer'ritt, **WESLEY** (1836-), an American soldier, born in New York City and educated at West Point. He served through the Civil War and attained the rank of major general in the United States volunteers and lieutenant colonel in the regular army. He served with the Army of the Potomac until June, 1864, with Sheridan in his Shenandoah campaign and as commander of a corps of cavalry in the Appomattox campaign. After the war he served in various departments, took part in several indian campaigns and in May, 1898, was assigned to the command of the United States forces in the Philippines. In December of that year he returned to the United States, and he retired in June, 1900, with the rank of major general in the regular army.

Mer'ry del Val', **RAFAEL** (1865-), a Catholic statesman and cardinal, born in London, educated at Brussels and at the Accademia dei Nobili Ecclesiastici. He became a favorite of Leo XIII, was promoted rapidly and after 1892 held important positions at the Vatican. He made an important and successful diplomatic visit to Canada in 1897. Upon the death of Mgr. Volpini, in 1903, Pope Pius X appointed Merry del Val papal secretary of state.

Mersey, *mur'zy*, a river of England, which rises in the northern part of Derbyshire, flows westerly and enters the Irish Sea through a broad estuary nearly 18 miles long. The length of the river is 70 miles. The estuary is navigable for large vessels and forms the harbor of Liverpool. It is with this stream that the Manchester Ship Canal connects.

Merthyr-Tydfil, *mur'thur tid'vil*, a city of Wales, situated in the n. e. part of Glamorgan, 22 mi. n. w. of Cardiff. It is the center of the iron and steel industry of southern Wales and also has large collieries. Population in 1901, 69,228.

Merv, *merj*, an oasis in Central Asia, north of Afghanistan, the principal seat of the Tekke Turkomans, who from this center used to make predatory incursions into Persia and Afghanistan. In 1881 General Skobeleff led a Russian expedition against the Tekke Turkomans, captured their stronghold of Greok Tepe and received the submission of the people. A railroad now extends through the oasis, and the district is an important strategic point.

Mesa, *ma'sa*, the name of a small plateau, usually having a flat surface and very steep slopes. The word is the Spanish name for *table*. Mesas are numerous in the southwestern portion of the United States and were formed by erosion (See **EROSION**). The top of the mesas indicates the former height of the plateau, which is from 200 to 500 feet above the surrounding country. Some of the mesas are covered with vegetation, but most of them are barren. Some of those in Arizona were formerly inhabited by a race of cliff dwellers and contain ruins which are of much interest. Some of them, as Mesa Encantada, or Enchanted Mesa, are regarded by the indians with superstition. See **PLATEAU**.

Mes'entery, **THE**, the broad fold of the peritoneum which attaches the small intestines to the spinal column. It holds the intestines in place and contains the blood vessels and nerves which pass to the intestines, the lacteal vessels and the mesenteric glands, which make the chyle more abundant. The glands are about one hundred fifty in number and are about the size of an almond. See **ABDOMEN**.

Mesh'hed or **Meshed**, a town of northeastern Persia, capital of the Province of Khorassan. It contains the shrine of Imam Riza, the son of the founder of the sect of Shiites, and is the sacred city of that sect. The chief manufac-

tures are velvets, sword blades and turquoise jewelry. Population, about 60,000.

Mes'mer, FRIEDRICH ANTON (1733-1815), a German physician, the first to advocate the use of hypnotism, which thereafter for many years was known as mesmerism. He professed to cure diseases by stroking with magnets, but about 1776 he abandoned their use and declared that his operations were conducted solely by means of the magnetism peculiar to animal bodies; hence, this influence exerted by one person over another is sometimes known as animal magnetism. Mesmer went to Paris in 1778 and, achieving considerable fame, made many converts to his views, though the regular physicians regarded him as an impostor. A committee from the Academy of Sciences investigated his pretensions and gave an unfavorable report, which caused his system to fall into disrepute. See HYPNOTISM.

Mes'merism, a process by which people may be thrown into a sleep or trance. It was first practiced by Friedrich Mesmer, for whom it is named. See HYPNOTISM.

Mesolonghi, *me'so lon'ge*. See MISSO-LONGHI.

Mes'opota'mia, a name given by the Greeks to an extensive region enclosed by the Tigris and Euphrates rivers, anciently associated with the Assyrian and Babylonian monarchies. At different times it belonged to Assyria, Babylonia, Persia, Greece, Rome and Arabia. It is now a part of Turkey in Asia, and is inhabited chiefly by Arabs, Kurds and Armenians. Many of the inhabitants are nomadic, and their chief occupation is cattle raising.

Mes'ozo'ic Era, that division of geologic time extending from the Paleozoic to the Cenozoic Era and including the Triassic, Jurassic and Cretaceous systems. See PALEOZOIC ERA; CENOZOIC ERA; GEOLOGY, and the systems named.

Mesquite, *mes ke'tay*, a small tree or shrub allied to the acacia. It is common in Mexico, Texas and other parts of West and North America, where in dry regions it often appears as about the only conspicuous form of vegetation. It yields a gum resembling gum arabic, but much inferior. Its seeds are sometimes eaten, and from the mucilage of its pods a drink is made.

Messe'nia, a country of ancient Greece, in the southern part of the Peloponnesus. It is celebrated for the long struggle of its inhabitants with the Spartans, with whom they waged three wars between the eighth and fourth centuries B. C.

In 369 B. C. the Spartan yoke was finally shaken off, and Messenia was independent until the Roman conquest in 146 B. C. Messenia is a province in modern Greece.

Messi'ah (anointed), a term applied in the Old Testament to the priests, to the kings and even to Gentile kings, as persons who had been anointed with holy oil. Its special application in the prophetic books of the Old Testament was to an ideal holy king and deliverer, whose advent they foretold. The whole of the prophetic pictures agreed in placing Jehovah in the central place of the desired kingship. These Messianic prophecies had, at the time of Christ, come to be applied by the Jews to a temporal king who should free them from foreign oppression. They are affirmed by Jesus Christ and his apostles to apply to and be fulfilled in him; and this is the belief of the Christian church, by which he is called "The Messiah." The rationalistic school of theologians asserts that Jesus laid claim to the dignity, either to meet the preconceptions of his countrymen or because he felt that the truth which he taught was the real kingdom which God was to set up, never to be destroyed.

Messina, *mes se'nah*, the chief commercial town and seaport of Sicily, capital of the province of the same name, on the Strait of Messina, about 200 mi. s. s. e. of Naples. The harbor is one of the best built in the Mediterranean, and the town is well built. Although the town is of great antiquity, its appearance is fairly modern. The manufactures consist chiefly of silk goods. The principal exports are silks, olive oil, oranges, lemons and other fruit, wine, salted fish and fruit essences. Messina possesses a university founded in 1548 and a public library of over 56,000 volumes. The town was founded presumably in the eighth century B. C., but its authentic history begins only with the fifth century B. C. During the Middle Ages it was in the possession of various nations. In 1861 it became a part of Italy. On Dec. 28, 1908, Messina was almost totally destroyed by an earthquake. Population in 1901, 93,672.

Messina, STRAIT OF, the channel which separates Sicily from Italy and connects the Ionian Sea with the Tyrrhenian Sea. It is about 20 miles in length and about 12 miles at its broadest, and 2 miles at its narrowest point. As the strait is very deep and the tidal current very strong, navigation is somewhat difficult. It was in the Strait of Messina that in ancient times the two sea monsters, Scylla and Charybdis, were supposed to dwell. See SCYLLA; CHARYBDIS.

Meta, *ma'tah*, a river of South America, a tributary of the Orinoco, which it joins in Venezuela, though the greater part of its course is in Colombia. It is about 600 miles in length and is navigable for about a third of this distance.

Metallurgy, *met'al lur'jy*, the art of separating metals from their ores. Metals are found in three classes of ores: those in which the pure metal occurs in veins or pockets, either in grains or loose nuggets; those in which the metals occur as oxides, and those in which the metals occur as sulphides. Ores of the first class need but little treatment. This consists in crushing the rock and separating the loose metal from it. This metal is then united into larger masses by smelting. The oxides constitute by far the largest class of ores, and it is from these that the supply of iron, lead, tin, copper and zinc is mostly obtained. Most of these ores can be reduced by smelting with a flux, as in the case of the manufacture of pig iron (See IRON). The sulphides are more difficult to treat, and some of them require several processes before the metal is obtained. In general, the treatment of this class of ores is as follows: The ore is crushed, and the metal-bearing portion is separated by running the crushed ore over vibrating tables, over which water is running. The particles containing the metal, being heavier than the others, settle at the bottom and form what is known as the *concentrate*. This concentrate is dried and roasted, to drive off the sulphur. The ore is then smelted; it yields an impure metal, which is purified by repeated smeltings. Copper ores containing sulphur are reduced in this manner.

Ores containing gold and silver are often treated by the *amalgamation* process. This consists in dissolving out the gold and silver with mercury. The ore is crushed in a stamp mill, in the trough of which mercury is poured. The gold and silver are obtained from the amalgam by distillation.

Low grade ores containing gold are often treated by what is known as the *cyanide process*. By this process the ore is crushed to a fine powder and subjected to treatment by a strong solution of cyanogen. This dissolves the gold or silver, while the other metals are left unchanged. The metals are then recovered from the solution by various processes. The gold is obtained by running the solution into a vat, in the bottom of which zinc shavings have been placed. The zinc collects the gold, which forms upon it in small nuggets or crystals.

Electrolysis is also extensively employed in metallurgy. By this process the ore or alloy is placed in a strong solution of the metal which it is desired to obtain and is then attached to the positive electrode, while a plate of the metal is attached to the negative electrode. When the current is caused to pass through the solution, it dissolves the metal from the ore and deposits it upon the plate attached to the negative electrode. The current may be provided either by a galvanic battery or by a dynamo, but where the work is carried on on a large scale, the dynamo is used. This method is particularly advantageous in obtaining copper from different ores, since that metal yields so readily to electrical action. The process is the same as that employed in electrotyping. See ELECTROTYPING.

Metals. Elementary substances have been divided by chemists into two classes, *metals* and *non-metals*, or *metalloids*, but these merge one into the other by gradations so imperceptible that it is impossible to frame a definition which will not either include some non-metallic bodies or exclude some metallic ones. Metals are opaque, having a peculiar luster, called *metallic*. They are insoluble in water; are solid, except in one instance, at ordinary temperatures; are generally fusible by heat; are good conductors of heat and electricity; are capable, when in the state of an oxide, of uniting with acids and forming salts, and have the property, when their compounds are submitted to electrolysis, of generally appearing at the negative pole of the battery. Many of the metals are also malleable, or susceptible of being beaten or rolled out into sheets or leaves, and some of them are extremely ductile, or capable of being drawn out into wires of great fineness. They are sometimes found native or pure, but more generally they are combined as ores with oxygen, sulphur and some other elements. Fifty-two of the elementary substances are usually regarded as metals, of which the following are the most important: aluminum, antimony, barium, bismuth, cadmium, calcium, cerium, chromium, cobalt, copper, gold, iridium, iron, lead, lithium, magnesium, manganese, mercury, nickel, platinum, potassium, silver, sodium, strontium, tin, tungsten, zinc. Each is described in its proper place in these volumes. Of these, gold, silver, copper, tin, lead, zinc, platinum and iron are the most malleable; gold, which possesses the quality in the greatest degree, is capable of being beaten into leaves $\frac{1}{100000}$ of a millimeter in thickness. In the order of their

ductility they are platinum, silver, iron, copper, gold, aluminum, zinc, tin, lead. Platinum wire has been made less than $\frac{1}{1200}$ of a millimeter in diameter. The majority of the useful metals are between seven and eight times as heavy as an equal bulk of water; platinum, osmium and iridium are more than twenty times as heavy; while lithium, potassium and sodium are lighter. The metals become liquid, or otherwise change their condition, at very different temperatures; platinum is hardly fusible at the highest temperature of a furnace; iron melts at a little lower temperature; silver, somewhat lower still, while potassium melts below the boiling point of water and becomes vapor at a red heat. Mercury is liquid at ordinary temperatures and freezes only at -39° F. Osmium and tellurium are regarded by some as non-metals. All the metals, without exception, combine with oxygen, sulphur and chlorine, forming *oxides*, *sulphides* and *chlorides*, and many of them also combine with bromine, iodine and fluorine. Several of the recently discovered metals exist in exceedingly minute quantities and were detected only by spectrum analysis, and there is every likelihood that research in this direction will add to the present list of metals.

Metamorphic, *met a mor'fik*, **Rocks**, in geology, rocks of any age, whose original texture has been altered and rendered less or more crystalline by subterranean heat, pressure or chemical agency. The name is given especially to the non-fossiliferous, stratified rocks, consisting of crystalline schists and embracing granitoid schist, gneiss, quartz rock, mica schist and clay slate, most of which were originally deposited from water and were later crystallized by heat and pressure. They exhibit for the most part cleavage, crumpling and folding, and their lines of stratification are often indistinct or obliterated. See METAMORPHISM.

Metamorphism, the term used by geologists to indicate the changes in structure and composition which rocks have undergone since their formation. While metamorphism does not apply to the decomposition of rocks, it may apply to their construction from decomposed material, as in the formation of sedimentary rocks from material that has been washed down from the hills and mountains. The most marked results of metamorphism are found in the oldest rock strata which have been changed by volcanic and other forces. The following are the changes resulting from metamorphism: (1) Hardening, as in the case of sandstones and other soft sedi-

mentary rocks; (2) change in composition and structure, as in the case of shales and slate; (3) crystallization, as in the formation of marble from common limestone. The agencies effecting these changes are heat, chemical action, moisture and pressure. Of these, heat and pressure are the most important. See GEOLOGY.

Metamorphosis, any change of form, shape or structure. In ancient mythology the term was applied to the transformations of human beings into inanimate objects, with which ancient fable abounds. In zoölogy the term at present includes those alterations in form which an animal undergoes in the process of its development from the egg to the mature individual. A typical metamorphosis is seen in the life history of the butterfly. The fertilized egg hatches into the larva, which, after reaching a certain stage of maturity, spins a cocoon and turns to the pupa, in which stage it remains quiescent for some time, then breaks forth from the cocoon transformed into the imago, or perfect butterfly, which lays the egg that begins again the circle of life (See INSECTS). While the metamorphosis of an insect is the typical form, yet many of the higher order of animals show similar changes. Among the amphibians, for instance, the frog lays eggs which become tadpoles that in time turn to adult frogs again. Similar changes may be recognized in the vegetable world.

Metaphor, *met'a for*, a figure of speech, founded on the resemblance which one object is supposed to bear, in some respect, to another, and expressed by transferring a name or epithet from an object, to which it properly belongs, to another, in such a manner that a comparison is implied, though not formally pointed out. It is in effect a simile without any word expressing comparison. Thus, "that man is a fox," is a metaphor; but "that man is like a fox," is a simile. So we say, a man *bridles* his anger; beauty *awakens* love or tender passions; opposition *fires* courage.

Metaphysics, *met'a fiz'iks*, a term generally applied to mental science, as distinguished from physical science. Metaphysics is of a higher order than all natural sciences, for its province is the consideration of the nature and validity of general notions, such as *matter*, *space*, *time*, *motion*, *cause* and *effect* and many others that are presupposed in all scientific investigation and theory. The physical scientist, for example, assumes that we live upon a sphere which is suspended in space and upon which all phenomena are governed by the law of cause and

effect. But the metaphysician is not content merely to assume the existence of space and the reality of the law of cause and effect; he *analyzes* these notions and determines their nature and value. Metaphysics is distinct from the science of psychology, for psychology deals only with the nature of the operation and laws of mental action, while metaphysics is concerned with the ultimate value of the general forms of thought peculiar to human consciousness.

Met'calf, VICTOR HOWARD (1853-), an American lawyer and politician, born at Utica, N. Y. He graduated from Yale Law School in 1876, was admitted to the bar in the same year and began practice in his native town. Two years later he moved to California, where he practiced law from 1881 to 1904. He served three terms in Congress, resigning to accept an appointment as secretary of the department of commerce and labor in 1904.

Me'teor, a name originally given to any atmospheric phenomenon, but now more usually applied to the phenomena known as shooting stars, falling stars, fire balls or bolides, aërolites, meteorolites or meteoric stones. It is generally believed that these phenomena are all of the same nature and are due to the existence of a great number of bodies, some of them very small, revolving round the sun, which, when they happen to pass through the earth's atmosphere, are heated by friction and become luminous. Under certain circumstances portions of these bodies reach the earth's surface, and these are known as meteorites, or meteoric stones. These stones consist of known chemical elements. They have this peculiarity, that whereas native iron is extremely rare among terrestrial minerals, it usually is present in meteorites. It is known as meteoric iron. Exceptionally large showers of meteors appear in August, from the ninth to the fourteenth day, and in November, on the thirteenth and fourteenth, every year. The November showers exhibit their greatest brilliancy every thirty-three years.

Me'teorol'ogy, the science which treats of the atmosphere, especially in its relation to climate and weather. Meteorology is a comparatively recent science, and its present degree of perfection has been reached through the observations made under the auspices of the governments of civilized nations. In making these observations, the conditions given the greatest weight are temperature, barometric pressure and humidity. Upon temperature and barometric pressure depend the prevailing winds,

which bring either fair or foul weather. The weather forecasts of a country are made known by a weather map, which appears daily, or oftener. The weather map of the United States bureau is published twice a day. This map shows the area of low pressure and the area of high pressure, which are marked respectively *low* and *high*. The direction of the wind is indicated, as are the places where rain or snow is falling. Places of equal temperature are connected by isotherms, and those of equal pressure, by isobars (See ISOBARS; ISOTHERMALS). All of these points of information are indicated by the use of symbols, which are described in explanatory notes accompanying the map.

By comparing the map under construction with the preceding one, the forecaster learns in what direction the areas of low pressure are moving and how far they have traveled during the interval. From this comparison, from the information contained in the last reports of the stations and from his experience, he is able to predict with a fair degree of certainty the weather for the various localities in his district for the next twenty-four or forty-eight hours.

Excellent weather bureaus are now maintained by Great Britain, France, Germany, Austria-Hungary and Japan, but that of the United States is the most extensive, and its information is the most generally distributed. See CLIMATE; STORMS; WEATHER BUREAU. Consult Davis's *Elements of Meteorology* and Ferrell's *Popular Treatise on Winds*.

Me'ter, the arrangement of words in rhythmic units, such as lines, stanzas and verses. The term is also applied to the unit of measure itself. A metrical line is divided into a number of units, called *feet*. In certain languages, particularly in Latin and Greek, the versification depends on the length of the vowels in the syllables in these feet; in English, however, as in the other Germanic and in the Romance languages, the meter depends on the number of syllables in a line and takes no account of the length of their vowels. The most common meters in English are iambic, in which a foot contains two syllables, an unaccented, or short, syllable and an accented, or long, syllable, in the order named; trochaic, in which a foot contains two syllables, a long and a short; anapestic, in which the foot has two short and one long syllable; dactylic, in which the foot has one long and two short syllables; amphibrachic, in which a foot consists of three syllables, the first and the last short, the middle one long.

Meter, the unit measure of length in the French, or metric, system, equal to about 39.37 English inches, or 3.28 feet, being the ten-millionth part of the distance from the equator to the pole, as ascertained by actual measurement of an arc of this meridian. See **METRIC SYSTEM**.

Meth'ane, Marsh Gas or Fire Damp, a gas produced by decaying vegetable matter under water, and therefore found in the gases which bubble up through stagnant water. It is colorless and odorless and burns with a blue flame. It is found in many coal mines and from its explosive nature has been productive of great damage.

Meth'odist Epis'copal Church. See **METHODISTS**.

Meth'odists, a general name given the followers of John Wesley. Wesley called his people the United Society. The first organization was formed in 1739. As the numbers increased, other societies were formed, and Wesley subdivided them into classes, placing a leader over each class. Each leader had his circuit, and several circuits were presided over by a clergyman, while Wesley was at the head of the organization. In 1741 lay preaching was introduced, and in 1784 the denomination became independent of the Church of England, the first act securing this independence being the consecrating of two men for missions in North America. In doing this, Wesley assumed power not granted him by the Church. At the conference held in Baltimore that year, the name *Methodist Episcopal Church* was assumed. While this is the leading branch of Methodists, there are a number of others. The Methodist Protestant Church grew out of a desire to have laymen admitted to the Church councils. In 1843 the Wesleyan Methodist Connection was organized by a following which was strongly opposed to slavery, and this was the beginning of a division of sentiment which led, at about the time of the Civil War, to the separation of the Church in the United States into two great divisions, the Methodist Episcopal Church, most of whose followers were opposed to slavery, and the Methodist Episcopal Church South, composed almost wholly of slaveholding members or members that were in sympathy with that institution. The Free Methodist Church was also organized in New York in 1860, and the African Methodist Church, designed particularly for colored people, was organized in Philadelphia in 1816, but

it did not receive any considerable membership until after the Civil War.

The chief doctrines of the Church are a belief that all men are sinners; that God the Father loves all men and hates sin; that Christ died for all men to make sure the salvation of all who believe in Him; that the Holy Spirit is given to all men to incline them to repent and believe in Christ; that all who repent are forgiven, regenerated and adopted as children of God, and that all who persevere to the end shall be saved in Heaven forever.

The governing body of the Church in the United States is a general conference, composed of the bishops and other general Church officials, of ministerial delegates and lay delegates elected by each conference, the number being apportioned in accordance with membership. This body meets every four years and legislates concerning all lines of Church activity. It also elects the general officers, such as bishops, secretaries and editors of the leading publications. The Church has always been active in missionary work and maintains missions in all parts of the world. In 1907 the number of communicants in the English-speaking world was 8,650,000, of which over 5,460,000 were in the United States. In this country there are about 49,000 ministers and 85,000 churches.

Meth'ods of Teaching, plans of procedure so as to obtain results in the instruction of children. The term *methodology* is also frequently used to denote the science of method. Since all learning is by mental activity of the learner, methods of teaching are founded upon the principles and laws of psychology, and the teacher should have a thorough acquaintance with these (See **PSYCHOLOGY**). The close relation of mind and body also makes it necessary that the teacher have some knowledge of the child's physical condition. She should at least understand the relation of effort to fatigue and the effect of fatigue upon the system, the plastic condition of the nervous system and the order of development of the mental powers. At school age the intelligence of children depends largely upon their home and neighborhood associations; hence, if she would be successful, the teacher must also become acquainted with the child's environment.

MENTAL PROCESSES. The mind is aroused to activity by impressions received through the special senses. When perceived, these impressions become ideas (See **SENSATION**; **PERCEP-**

tion). Ideas thus obtained are elaborated by mental processes, such as imagination and reason. There are, then, two sources of knowledge—the world about us, and the mind itself; but in order that the second source may be available, the mind must first acquire ideas through the senses. The first work of the teacher of young children is to assist them in getting these ideas. During the first few years, the child's powers of observation, his memory and his imagination should receive careful training. As the reasoning powers develop, the child should be led to increase his dependence upon them. From the fourth grade on, especially, the teacher should give attention to the development of the reasoning powers, as well as to the development of the powers of observation and memory. See CONCEPT; REASON.

PRESENTATION OF SUBJECTS. Attention is essential to learning. If the child is to acquire an idea, he must concentrate his mental powers upon it, and this requires an act of will. But before the child wills to give his attention to an object, he must feel that a knowledge of it will satisfy some want; that is, he must have an interest in it. The teacher's success depends upon her ability to awaken this interest. In her presentation of subjects, she should be guided by a few general principles. These are:

(1) Interest is common to all children, but often needs to be directed by the teacher.

(2) Children are most easily interested in what they know something about; therefore, in selecting subjects for young children, the teacher should have due regard for what they already know. It would be difficult to interest a beginning class of a rural school in a large building or a city street which they had never seen, and it would be equally difficult to interest a similar class of a city school in a cornfield if they had never visited the country.

(3) Children are not interested in what they cannot understand; therefore, each lesson should be a preparation for the one to follow, and the grade of work should be kept well within the capacity of the children.

(4) Interest leads to attention, and attention requires effort and is followed by fatigue. Most lessons in primary grades should not exceed ten or fifteen minutes in length. With older pupils the time can be extended, but in all cases, when interest begins to wane the exercise should be changed. The arrangement of the lesson

should be logical, so that pupils will have no difficulty in seeing the relations of the parts to each other, and the presentation should be such that the connection with the previous lesson is equally clear. The teacher's explanation should be in simple language and should contain such illustrations as will appeal to the pupil's experience. Descriptions should be clear, vivid and lifelike. See ATTENTION; FEELING; INTEREST.

FORMAL STEPS IN LEARNING. The pupil must take three formal steps in every complete act of learning, namely, the formation of the individual idea or notion, the formation of the class idea, or the general notion, and the application of the general notion to individual notions or ideas. In other words, these steps are the acquisition of knowledge, the classification of knowledge and the use of knowledge.

The Individual Notion. All ideas obtained through the senses or by concrete illustrations are distinct, as the idea of a chair, a house or a good deed. They are obtained by the observation of individual objects or by the hearing of particular instances of what others have done, and they contain the qualities belonging to each of these objects or instances, respectively. Their acquisition is the first formal step in gaining knowledge, and during the first ten years of his life, the child's mental energies are very largely occupied in acquiring individual notions. See PERCEPTION.

The General Notion. Unclassified knowledge is of but little use, and the child soon begins to compare his ideas. In so doing, he discovers their resemblances and differences. If he is acquainted with a cat and unacquainted with a dog, upon his first seeing a dog he may call it a cat, because he notices that each has four legs and fails to notice the points of difference. With further observation of dogs and cats, he discovers that they have more points of difference than of resemblance, and he forms a conclusion that a dog is not a cat. He has now arranged his ideas of dog and cat in two groups, each of which includes certain qualities that do not belong to the other. In a similar manner, he classifies all his other ideas. Each class idea is a general notion. Its formation requires the use of all mental powers and is much more difficult than the formation of individual notions.

A general notion includes only those qualities common to all the objects of the class to which it applies; that is, it is abstract. The notion *man* includes only those qualities common to all

men, and it cannot be perceived by the senses, but as soon as the idea comes into consciousness, it is applied to an individual, and its existence is seldom noted. For these reasons general notions are not easily understood.

The teacher should assist the pupil in the formation of general notions. The first step is to see that the pupil acquires correct and well-defined individual notions; the second is to prevent the formation of conclusions without sufficient observation, and the third is to show the pupils the value and importance of a good stock of general notions. The principles and rules of arithmetic are good illustrations of general notions. From the beginning of the study of number, the teacher should lead the pupils to discover these principles and to construct the rules. See **INDUCTIVE METHOD**.

Application of the General Notion. When a new idea is received, it is compared with ideas already in the mind and classified. If a child has formed the general notion *fruit*, the first time he examines a quince he will compare it with this idea and decide that it is or is not a fruit. His conclusion will be right or wrong according to the correctness of his general notion and the care with which he examines the object (See **APPERCEPTION**). This is the third formal step in the act of learning and is essential to the success of the other two. It is the measure by which they are to be judged. Use is the only true test of knowledge. Unless the pupils can apply their rules of arithmetic to the solution of real problems; unless they can apply their definitions in language to selections which they have not before seen, the teacher may be certain that their general notions are not well defined. Failure to apply general notions usually follows the memorizing of rules and definitions without first discovering them experimentally. Within the range of their capacity pupils should have a large amount of work requiring the application of the general notions which they have formed to new individual notions. See **DEDUCTIVE METHOD**.

While these mental processes and formal steps have, for the purpose of treatment, been considered separately, it should be remembered that they all belong together, but that at one time the teacher should give particular attention to one, and at another time, to another, as the conditions require.

CLASSIFICATION OF METHODS. The particular stress placed upon the different steps in an act of learning has led some authorities to

classify methods as analytic or, synthetic inductive or deductive. By the first is meant the study of an object in such a manner as to discover its various qualities, which are considered one after the other. All objects are first apprehended as wholes, and their complex nature is afterwards determined by analysis. The second, or synthetic method, means the combination of qualities ascertained by analysis into a new whole, different from that with which we began. Inductive and deductive methods are explained under their respective heads.

But methods are classified for very much the same purpose as the mental processes are, and what are termed different methods are only different phases of method. A good method uses them all. In forming his individual notion of an orange, the child first comprehends it as a round, yellow object. He then proceeds to test it with all his senses and combines into his idea the qualities he thus ascertains. His second idea, a new whole, is much more complex than the first. In forming his general notions, the child holds in mind the qualities of the object which the notion includes, groups together those qualities common to all the objects in the class and rejects the others. In all the steps attending an act of learning, the question is the most potent instrument which the teacher can use. By questions she can direct the child's thought, steer him clear of entangling side issues and stimulate his attention until he reaches the desired end.

METHOD AND DEVICES. Careful distinction should be made between method and devices. The method is a systematic plan of teaching, based upon the laws governing mental development. A device is a scheme for assisting a pupil or a class to understand a principle or for holding the attention on a subject which of itself is not of particular interest. Blocks for teaching number, objects and pictures for teaching language, are devices to assist in carrying out the method selected by the teacher. Devices are useful and necessary, but they should always be chosen with care and so used as to assist in carrying out the method adopted. The danger attending their use is that they will be continued too long and will be given too much prominence.

In addition to the articles referred to, see **IMAGINATION**; **MEMORY**; **WILL**; **HABIT**. Consult McMurry's *General Method* and *The Method of the Recitation*; De Garmo's *Essentials of Method*; Compayre's *Lectures on Pedagogy*, and Salisbury's *The Theory of Teaching*.

Methu'en, MASS., a town in Essex co., 2 mi. n. of Lawrence, on the Spicket River and on the Boston & Maine railroad. It has the Nevins Memorial Library and contains manufactures of cottons, woollens, knit and worsted goods, yarns, baskets, organs and other articles. The place was settled in 1641 and remained a part of Haverhill until 1725. Population in 1905, 8676.

Meth'yl Al'cohol. See WOOD ALCOHOL.

Meth'ylated Spirit or **Wood Spirit**, spirit of wine, containing ten per cent of wood naphtha, which contains a large proportion of methylic alcohol. The naphtha communicates a disagreeable flavor, which renders it unfit for drinking. It is of much use in the arts as a solvent for preserving specimens and in the manufacture of paints and varnishes.

Meton'ic Cy'cle, a cycle of nineteen years, invented by Meton the Athenian, about 432 B. C. The Greeks reckoned time by lunar months, and so, in order to bring their religious festivals and rites in accord with the seasons, they tried to make the solar year of 365 days, 5 hours, 48 minutes and 56 seconds into accord with twelve lunar months, or 354 days, 8 hours and 48 minutes. By Meton's invention, 7 months, 5 of them having 30 days and 2 having 29 days, were inserted, one every third, sixth, eighth, eleventh, fourteenth, seventeenth and nineteenth year of the cycle. The slight error in this was corrected afterward by Callippus. The date at which the Metonic cycle began is not certain, but authorities agree that the corrected Callippic cycle began June 29, 330 B. C. The number of any year in the cycle was called the *golden number*. Since the adoption of the Gregorian calendar, the golden number of any year is reckoned from 1 B. C., as in that year the new moon fell on January 1. To find the golden number of any year of the calendar, add one to the year and divide by nineteen. The undivided remainder is the golden number; if there is no remainder, the golden number is nineteen and the year is the last of a cycle. Thus, the golden number of 1904 was five. See EPACT.

Meton'ymy, the name given to the figure of rhetoric which consists in the substituting for one thing another which is closely related to it. Thus, a part may be substituted for the whole, the abstract for the concrete, or the symbol for the thing symbolized, as, "Gray hairs should be respected."

Met'ric System, a system of weights and measures of which the unit is the meter, which was originally equal in length to one ten-millionth

of a quarter of the meridian of the earth. This is divided into tenths, hundredths, thousandths, etc., for units of lower denominations, and multiplied by 10, 100, 1000, etc., for units of higher denominations. The names of the larger units are formed by the use of the Greek prefixes *deka* (10), *hekto* (100), *kilo* (1000), *myria* (10,000); the names of the divisions of the standard unit are formed by the use of the Latin prefixes *deci* (.1), *centi* (.01), *milli* (.001). Thus, 1 dekameter equals 10 meters, 1 hektometer equals 100 meters, 1 kilometer equals 1000 meters; 1 decimeter equals .1 meter, 1 centimeter equals .01 meter, 1 millimeter equals .001 meter. Even the units of capacity and weight are based upon the linear unit. Thus, 1 liter, which is the unit of capacity, equals a cubic decimeter. The gram unit of weight equals the weight of one cubic centimeter of distilled water at a temperature of 4° centigrade. The square dekameter, a common unit of surface measure, is also called the *are*. The square hektometer is called the *hektare*. The following table gives the approximate equivalent of the important units of metric weights and measures in units of the English system:

1 meter = 1.093 yds. = 3.28 ft. = 39.37 in.
 1 kilo. = $\frac{2}{3}$ mi.
 1 liter = 1 cu. dm. = 1 qt. = .028 bu. = 61.035 cu. in.
 1 kilog. = $2\frac{1}{8}$ lbs. avoird.
 1 gram = .002 lbs. avoird. = .032 Troy oz. = $15\frac{1}{2}$ gr.
 1 are = .025 acres = 119.603 sq. yds.
 1 hektare = 2.471 acres = 11,960.332 sq. yds.
 1 sq. meter = 10 sq. ft.

The metric units, being based upon the decimal system, are far more conveniently handled than those of the English system and are being adopted in all parts of the world. The metric system is now the obligatory system in Germany, Austria-Hungary, Belgium, Brazil, Chile, Argentina, Spain, Greece, Mexico, the Netherlands, Peru, Portugal, Rumania and Servia, Norway, Sweden, Switzerland and Venezuela and has been legally authorized in Egypt, Great Britain, Russia, Turkey and the United States. In the United States it is now used in the arts and sciences and in many governmental departments. Efforts have been made at frequent intervals for more than a century to have the system officially adopted in the United States, but so far without avail.

Met'ronome, an instrument consisting of a weighted pendulum moving on a pivot and set in motion by clockwork. Its purpose is to mark, by its vibrations, the quickness or slowness with which musical compositions are to be

executed. There is a sliding weight attached to the pendulum rod, by the shifting of which up or down the vibrations may be made slower or quicker, an accompanying scale indicating the number of audible beats per minute.

Metternich, *met'tur nīK*, CLEMENS WENZEL NEPOMUK LOTHAR, Prince (1773-1859), an Austrian statesman. He represented Austria as ambassador at various European courts between 1801 and 1809. In the latter year he became minister of foreign affairs. In 1813, after the French reverses in Russia, Austria gave in her adhesion to the other allied powers and declared war against France. From this period the policy of Austria, and in a great measure that of the other leading Continental powers, was shaped by Metternich. His policy was always reactionary and strictly opposed to the feeling of nationality which was growing up in Germany (See HOLY ALLIANCE). He continued in power till, by the revolution of 1848, he was driven from office and had to flee to England, where he remained till 1851.

Metz, a city of Germany, capital of the district of Lorraine, at the confluence of the Moselle and the Seille, 80 mi. n. w. of Strassburg. The city consists of an older portion, with narrow streets, and a well-built newer part, which has beautiful open squares and some fine buildings. Among the most noteworthy buildings is the Cathedral of Saint Stephen, which was begun in the thirteenth century. The manufactures comprise leather, shoes, woollens, cottons, hosiery, hats, muslin and glue. From the middle of the sixteenth century, Metz belonged until 1870 to France. On October 27, 1870, Bazaine, with the French army, surrendered here to the Germans, and the city was included in the cession of territory to Germany at the peace of 1871. Since that time its fortifications have been greatly strengthened. Population in 1900, 58,524.

Meuse, *mōz*, a river of Europe which rises in France in the southern part of the Department of Haute-Marne and flows through France, Belgium and the Netherlands, and after joining the Waal flows into the North Sea. Its length is 575 miles, and it is navigable for about 400 miles. It is connected with the Moselle and the Oise by Canals.

Mexican War, THE, the war between the United States and Mexico in the years 1846-1848. The fundamental cause of this struggle was the desire of the pro-slavery party in the United States to secure additional slavery terri-

tory. This led to an early recognition of the independence of the Republic of Texas, in 1837, to the long agitation in favor of the annexation of Texas in spite of Mexico's earnest opposition, an end which was accomplished in 1845, and, finally, to a dispute over the boundary of Texas. As a Mexican state, Texas had been bounded on the south by the Nueces River, but when admitted to the Union it claimed, and was supported by the United States in the claim, that the Rio Grande was its natural boundary. In 1845 James K. Polk became president, and his open ambition was to gain for the United States all the territory of California, Oregon, New Mexico and Texas. He therefore ordered



General Taylor, who had been stationed at the Nueces River with about three thousand men, to cross that river and proceed to the Rio Grande. This was done and was answered by a counter-advance by the Mexicans into the disputed territory. On April 23, 1846, a small body of Americans was defeated by a force of Mexicans. Immediately President Polk sent a message to Congress, declaring that a state of war existed "through the act of Mexico herself." Congress accepted this partial view of the matter and on May 13 declared war and immediately voted money and supplies for its prosecution.

On May 8 General Taylor met a body of about six thousand Mexicans at Palo Alto and administered a severe defeat, though his own troops numbered but two thousand. The Mexicans fell back upon Resaca de la Palma, but were again defeated on the following day. Taylor's spring campaign ended May 18, when he occu-

ped Matamoros. There he remained until September, when he advanced upon Monterey, which fell after a short siege, September 24. Meantime, American troops had occupied New Mexico and upper California, and Colonel Doniphan had taken possession of the important territory around Chihuahua.

These American successes, however, were not sufficient to lead the Mexicans to overtures of peace; consequently, in the following spring General Scott was sent to the front with a new force. He also took ten thousand men from General Taylor's army. Scott landed at Vera Cruz on March 7, 1847, and conducted a continuous bombardment until March 27, when the city surrendered. The Mexican general, Santa Anna, though formerly exiled for his failure to accomplish the subjugation of Texas, had now returned and was in supreme command of the Mexican troops. He decided to march against Taylor, whose force had been depleted. He reached the vicinity of Monterey, February 20. Taylor retired to Buena Vista, where he inflicted a severe defeat three days later, with a loss of about eight hundred, the Mexican loss being fully twice as many.

Two months later Scott left Vera Cruz, stormed the mountain pass of Cerro Gordo and pressed on, driving the Mexicans before him, toward Puebla. There the Americans rested until August, when they moved forward, about eleven thousand strong. On August 19 and 20 three severe battles were fought about ten miles from the City of Mexico, at Contreras, San Antonio and Churubusco. In all, the Americans were far outnumbered, but by the greatest skill and bravery they gained decisive victories. After an armistice of about three weeks, Scott advanced to the city's gates and won a brilliant victory at Molino del Rey. On September 13 he stormed the heights of Chapultepec and on the next day entered the Mexican capital in triumph.

The war was ended by the Treaty of Guadalupe Hidalgo, which was signed February 2, 1848. The most remarkable feature of the contest was the training which it furnished to young officers who later played conspicuous parts in the great Civil War. Among these were Stonewall Jackson, George B. McClellan, George G. Meade, U. S. Grant, Robert E. Lee and Jefferson Davis, who was to be president of the Confederacy. It also resulted in the elevation of General Taylor to the presidency in the following administration.

(For a more detailed story of the battles of the

Mexican War, see articles upon the important battles, also the biographies of the leading actors, and the article upon GUADALUPE HIDALGO, TREATY OF.)

Mex'ico, a republic of North America, between the United States and Central America. It is bounded on the n. by the United States and the Gulf of Mexico, on the e. by the Gulf of Mexico, the Caribbean Sea and British Honduras and on the s. and w. by the Pacific Ocean and Guatemala. The boundary between Mexico and the United States has a length of 1833 miles, of which the Rio Grande, the boundary between Mexico and Texas, forms 1136. The country narrows rapidly from its northern extremity. In the south, the peninsula of Yucatan turns northward, and on the west, the large narrow peninsula of Lower California, separated from the mainland by the Gulf of California, extends southward for about 700 miles. The total area of Mexico, including the islands about the coast, is 767,000 square miles, or nearly three times that of Texas.

SURFACE AND DRAINAGE. Mexico is, roughly speaking, composed of a large central plateau, or tableland, above which rise mountain peaks; two border ridges, the Sierra Madre Oriental on the east, and the Sierra Madre Occidental on the west, and narrow coast lands at the foot of the plateau. The principal summits which rise above the plateau are of volcanic origin. Some few of these are semi-active or dormant, but the greater number of them are extinct. The chief of these volcanoes are Orizaba, or Citlaltepetl (Star Mountain), 18,250 feet high, the loftiest point in the country; Popocatepetl (Smoky Mountain), 17,520 feet high, the most famous of Mexican volcanoes; Ixtaccihuatl (White Woman), 16,950 feet high; Nevado de Toluca, 14,950 feet; Malinche, 13,460 feet; Cofre de Perote, 13,400 feet, and Jorullo, 4330 feet. This last volcano is famous because it is said to have risen above the plain in a single night of its eruption in 1759. Most of these volcanoes are situated near the southern border of the great plateau. The three first named are above the limit of perpetual snow, which is here almost 15,000 feet.

The total coast line of Mexico is somewhat over 7300 miles. The ports on the Atlantic side are most of them insecure, and many of them are mere roadsteads. On the western coast there is, however, a series of magnificent ports from Acapulco to Guaymas, many of which are scarcely, if at all, frequented. This is accounted

for by the fact that they are separated from the industrial center of the country by lofty mountains, and transportation is therefore difficult and expensive. The largest river of Mexico is the Río Grande del Norte, which forms the boundary between the United States and Mexico and belongs partly to each country. The other rivers are for the most part insignificant, as many of them are but rapid torrents, which descend from the central plateau to the sea, overflowing at some seasons of the year and drying up at others. The lakes of Mexico are numerous, but of little importance. Some of them have no outlet. Chapala, which is mostly in Jalisco, is the largest lake in the country.

CLIMATE. Mexico lies between latitude 14° 30' and 32° 40' north and is therefore for half of its length in the Torrid Zone. The peculiar structure of the surface, however, causes the greatest diversity of climate. The Mexicans divide their climate into three zones—the hot lands, along the coast, extending to an elevation of about 3000 feet; the temperate lands, from 3000 to 6000 feet above the sea, and the cold lands, 7000 feet or more above sea level. In the first of these zones the mean annual temperature is from 78° to 82° F., and the sea-coasts are exceedingly unhealthful. In the temperate zone the temperature is from 62° to 70°, and in the cold lands, from 59° to 63° F. The rainfall is exceedingly uneven. Over most of the plateau it is not more than 25 inches, while in some other parts of the country it is as high as 130 inches. Earthquakes are not infrequent, but they usually do little damage.

MINERAL RESOURCES. In its mineral resources Mexico is one of the richest countries in the world. It leads the world in the production of silver, and although the gold-mining industry has received comparatively little attention, on account of the great expense involved, it is known that there is gold in great abundance. Among the other minerals are copper, lead, quicksilver, tin, sulphur, salt, cobalt and antimony. In fuel, Mexico is deficient. Much of the coal used is brought from England and the United States, although there are coal beds in the country which, if they were not so far from lines of transportation, would furnish fuel in plenty.

AGRICULTURE. Mexico is a country of great natural resources. There is a vast variety of useful indigenous trees and plants, and many others have been introduced. In the forests along the coasts may be found palms and

acacias, rubber trees, mahogany, ebony and ironwood trees, while in the higher zones evergreen oaks, pines, firs and spruce flourish. The principal agricultural products are sugar cane, coffee, cacao, vanilla, corn, tobacco, indigo and the agave, or American aloe, some species of which are cultivated for their fiber, known as sisal hemp, and some for the juice, which, when fermented, forms the national beverage of Mexico, known as *pulque*. Stock raising is one of the leading industries of the country, especially in the north. The cattle are small and of rather inferior quality; the horses are small and hardy, and the sheep produce a coarse and inferior quality of wool. Much is being done, however, to improve the breeds of all of the domestic animals.

MANUFACTURES. The leading manufactures of Mexico are those of distilled liquors, cotton and woolen goods, pottery, tobacco and cigars, rum and molasses.

TRANSPORTATION. Within the last quarter of a century the railroad system of Mexico has been greatly improved. There are over 12,000 miles of railway in operation, and connections exist between all of the principal cities and commercial centers. The cities are supplied with tramways. There are 45,000 miles of telegraph lines and a telephone system including 27,220 miles of line.

COMMERCE. Among the exports of Mexico, the precious metals are by far the most important, constituting on an average about two-fifths of the total exports, or, in the year 1904-1905, about \$79,000,000 out of about \$194,000,000. The other important exports are sisal hemp, copper, lead, coffee, woods, tobacco and animal products. The imports of the country, which are smaller in value than the exports, are largely cotton and woolen manufactures, wrought iron and machinery. By far the greater part of the exports go to the United States, which furnishes more than one-half of the imports, or, in 1904-1905, about \$48,000,000 out of about \$85,000,000.

INHABITANTS AND LANGUAGE. Of the population of Mexico, about 20 per cent are pure white, 43 per cent are of mixed race, and the remainder are indians (See INDIANS, AMERICAN, *color plate*, Figs. 8 and 9). The creoles, persons of Spanish-Aztec descent, are the dominant race, and the Spanish language is generally spoken throughout Mexico. Of the foreign nations, the English, the Germans and the French are best represented, and there are certain

branches of trade which are almost entirely in the hands of these peoples.

EDUCATION. In most of the states of Mexico education is free and compulsory, but as the compulsory education laws are by no means strictly enforced, illiteracy is very common. Little has been done toward the education of the indians, and even the foreigners, except those who are prominently engaged in trade, are uneducated. The schools are supported partly by the central government, partly by the state governments and partly as charitable institutions. There are law, medical, agricultural and engineering schools and numerous museums and libraries, the most noteworthy of which is the national library, with 205,000 volumes.

GOVERNMENT AND RELIGION. Mexico is a federal republic, consisting of 27 states, 3 territories and a federal district, which comprises Mexico, the capital of the Republic, and a small portion of adjoining territory. The constitution, which was adopted in 1857, is modeled on that of the United States and leaves the states supreme in their internal affairs. The executive power is vested in a president, who is elected for a term of six years by electors chosen by the people. An amendment to the constitution was passed in 1890, providing that the president may be elected for any number of consecutive terms. There is no vice-president, but Congress has the power to choose an acting president when the president is unable to fulfill his duties. The cabinet consists of seven members, whose departments are foreign affairs, interior, justice and public instruction, fomento (industry and colonization), communication and public works, finance and public credit, war and marine. The legislative branch of the government is composed of a Senate and a House of Representatives. The representatives and senators are chosen by indirect election, the senators for four years, the representatives for two. There are two senators from each state and from the federal district, and half of them are chosen every two years. The judicial power rests with the Supreme Court and district and circuit courts. Each state elects its own governor and its own legislature, which usually consists of but one house.

Roman Catholicism is the prevailing religion, but there is no State Church. All religions are tolerated, but no religious body can own landed property. Out of over ten thousand churches, fewer than two hundred are Protestant. Some

few of the indians hold to their idolatry, but most of them have been converted to Christianity.

CITIES. The chief cities are Mexico, the capital; Guadalajara, Puebla, San Luis Potosi, Guanajuato, Leon, Monterrey, Merida, Vera Cruz, Oaxaca, Orizaba, Morelia, Pachuca, Zacatecas and Saltillo, each of which is described under its title.

HISTORY. Before 1521 Mexico was inhabited by the Aztecs and was ruled by native emperors. This race had attained a remarkable degree of civilization, and interesting remains of their architecture are extant in the teccallis, or pyramids, of Cholula, Puebla and Papantla (See AZTEC). In 1521 Mexico fell into the hands of the Spaniards under Cortez (See CORTEZ, HERNANDO). Cortez called it New Spain and was created its captain general. Many Spaniards emigrated from Spain, and in time New Spain came to include a vast territory to the north of the present Mexico. The first viceroy was appointed in 1535, and from that time for almost three centuries the country remained a Spanish possession. The spirit of discontent caused by the selfishness of the Spanish rule manifested itself in open rebellion, when, in 1808, the unsettled state of affairs in Spain offered an opportunity. This rebellion, begun by a priest, Hidalgo, was continued with more or less vigor, and in 1821 the independence of Mexico was assured. After an unsuccessful attempt to secure a Bourbon prince for the throne, Iturbide, the chief of the insurgents, caused himself to be proclaimed emperor, in May, 1822. In the following year, however, he was forced to abdicate, and in 1824 a constitution, modeled in part on that of the United States, was adopted and a Federal Republic was proclaimed. Since the acquisition of its independence Mexico has had a most unsettled history, and has been the scene of almost incessant civil wars. A revolution in Texas in 1835 procured the independence of that territory, and eleven years later a dispute regarding the boundary of Texas led to a war with the United States (See MEXICAN WAR, THE). By the treaty which closed this war, New Mexico, which included part of the present Arizona and New Mexico, all of Utah and Nevada and part of Upper Colorado and Wyoming, were given up to the United States. In 1862-1863 a French army entered Mexico, and under the protection of Napoleon III, Maximilian reigned as emperor from 1864 to 1867 (See MAXIMILIAN). In 1867 the Republic was again pro-

claimed, with Juarez as president. Since 1876 Mexico has developed greatly, chiefly owing to the ability of Porfirio Diaz, who from that date was president for more than thirty years, with the exception of the term from 1880 to 1884 (See DIAZ, PORFIRIO).

The population of Mexico cannot be ascertained with exactness, as correct census returns cannot be obtained from the indians. In 1900, however, the records showed the population to be 13,605,919.

Consult Maturin M. Ballou's *Aztec Land*, Charles F. Lummis's *The Awakening of a Nation* and Elizabeth Visere McGary's *An American Girl in Mexico*.

Mexico, the capital of the Republic of Mexico, in the State of Mexico and within the federal district, about 7400 feet above the level of the sea. It is about equally distant from Vera Cruz, on the Mexican Gulf, and Acapulco, on the Pacific. It is built on a beautiful site and is laid out with great regularity. The city is distinctly Spanish in appearance, as a result of the long Spanish rule in Mexico. The great square, known as the Plaza de Mayor, or Plaza de Armas, is the center of the life of the city. The principal buildings are the cathedral, which forms one of the sides of the central square and is one of the most magnificent churches in America; the national palace; the National Museum of Natural History and Antiquities, which contains a remarkable collection of Aztec relics; the national library, which contains over 200,000 volumes; the mint, and the School of Mines. There are also numerous convents, hospitals, churches and theaters. The manufactures are of comparatively little importance and comprise linens, silks, gold and silver ware, hats, carriages and soap. The most of the trade is in the hands of foreigners. Mexico has a mild and healthful climate, and since the introduction of an improved system of drainage the death rate, previously very high, has decreased. Population in 1900, 344,721.

Mexico, Mo., the county-seat of Audrain co., about 112 mi. n. w. of Saint-Louis, on the Salt River and on the Wabash, the Chicago, Burlington & Quincy and the Chicago & Alton railroads. The city is in an agricultural region producing wheat and corn, and it has a considerable trade in horses and cattle. There are flour mills, foundries and manufactures of dressed marble, agricultural implements and other articles. Hardin College for women and

the Missouri Military Academy are located here. The place was settled in 1833 and was incorporated in 1852. Population in 1900, 5099.

Mexico, GULF OF, a large bay or gulf of the Atlantic Ocean, on the eastern coast of North America. It is oval in form and is nearly surrounded by a continuous coast line of the United States and Mexico, about 3000 miles in length. Among the important rivers which empty into the Gulf of Mexico are the Mississippi, the Rio Grande, the Colorado of Texas and the Appalachicola. The most important ports on the gulf are Key West, Tampa, Pensacola, Mobile, Galveston, Tampico, Vera Cruz and Havana. The Gulf Stream issues from the Gulf of Mexico by the Florida Straits (See GULF STREAM).

Meyer, GEORGE VON Lengerke (1858-), an American politician and diplomatist, born at Boston, Mass., and educated at Harvard University. After graduation he engaged in business and was elected to the common council of the city of Boston; later he entered the state legislature and became speaker of the house. He took a prominent part in the management of Republican party organization in Massachusetts and in 1900 was appointed ambassador to Italy by President McKinley. In 1905 he was transferred to Russia, and in the following year he was appointed postmaster-general, to succeed George B. Cortelyou, whose resignation took effect in March, 1907.

Meyerbeer, *mi'ur bair*, GIACOMO (1791-1864), a musical composer, born in Berlin. He studied at Berlin, Darmstadt and Vienna. His first two operas, *Jephtha's Daughter* and *Abimelek*, failed. He then went to Italy, where he rapidly composed a series of operas which were generally well received. In 1826 he went to Paris. There he produced his three greatest works, *Robert le Diable*, *Les Huguenots* and *Le Prophète*. In these operas he ceased to be an imitator of the Italians and disclosed original powers of a high order.

Mezzo-Rilievo, *med'zo re lya'vo*, or middle relief, is the term applied in sculpture to figures that project one-half their thickness from the background. It is higher than bas-relief and lower than *alto-rilievo*. In *mezzo-rilievo* the figures are fully rounded, but there are no portions which are detached from the surface. See ALTO-RILIEVO; BAS-RELIEF.

Mez'otint, a particular manner of engraving on copper or steel, in imitation of painting in India ink, the lights and shadows being scraped

and burnished out of a prepared dark ground. The surface of the plate is first completely covered with minute incisions, so that it would give in this condition a uniform black impression. The design is then drawn on the face, and the dents are erased from the parts where the lights of the piece are to be, the parts which are to represent shades being left untouched or partially scraped, according to the depth of tone. See ENGRAVING; ETCHING.

Miami, *mi ah'me*, a tribe of intelligent indians who lived in mud-covered houses in stockaded towns in southern Wisconsin. About 1690 they settled near the present site of Chicago and extended their conquests east to the Miami River in Ohio, and they finally made their principal settlement near where Fort Wayne now stands. They were engaged in the conspiracy of Pontiac, and under Tecumseh they fought against the United States. After the War of 1812 they were moved westward, and now probably not more than one hundred are living.

Miami or **Great Miami**, a river in Ohio, which rises in Hardin co. and joins the Ohio 20 miles west of Cincinnati. Its length is about 150 miles. Troy, Dayton, Hamilton and Sidney are the chief towns past which it flows.

Mi'ca, the name of a group of minerals composed largely of aluminum and silica, with various proportions of potassium, sodium, iron, magnesium or some other mineral. The leading characteristic of the group is their formation into layers, which can be split into very thin plates, sometimes not more than $\frac{1}{1000}$ of an inch in thickness. Mica is always found surrounded by other rocks. It is separated from these and then cut into blocks, which are then split into sheets of such thickness as are desired for the various uses to which the stone is put. Sometimes plates as large as eighteen inches in diameter can be obtained. Mica is used for windows in ships and in other places where glass would be injured by jarring or by heat, as in doors of coal stoves. It is also used in the manufacture of dynamo electric machines. The most extensive quarries in the United States are found at Grafton, N. H.

Micah, **Book of**, one of the prophetic books of the Bible, considered until recently to be the work of the prophet Micah, a contemporary of Isaiah, between 734 and 700 B. C. Recent criticism gives the first three chapters only to Micah. The prophecy refers to both Judah and the northern kingdom.

Mica Schist, *shist*, a metamorphic rock, characterized by its arrangement in layers, which are often folded. It is composed almost entirely of mica and quartz. The mica is usually colorless, but may be dark, and its arrangement in layers enables the rock to be easily split into thin slabs. Mica schist is abundant in mountainous regions and contributes very largely to the formation of the Appalachian and White Mountains. The peculiar whiteness of these mountains, from which they take their name, is caused by the reflection of light from this rock.

Michael, *mi'ka el* or *mi'kel*, **SAINT**, in Jewish theosophy, the greatest of the angels, one of the seven archangels, Michael, Gabriel, Raphael, Uriel, Chamuel, Jophiel and Zadkiel, which "stand before God." The first three, the principal ones, are often represented together in Christian art. In the New Testament Michael is spoken of as the guardian angel of the Church. See MICHAELMAS.

Michaelmas, *mike'el mas*, the feast of Saint Michael the Archangel. It falls on September 29 and is supposed to have been established toward the close of the fifth century. In England, Michaelmas is one of the regular terms for settling rents. The Lord Mayor of London is elected on Michaelmas day.

Michelangelo Buonarroti, *me kel ahn'je lo bwo'na ro'te*, (1475-1564), a celebrated Italian



MICHELANGELO

sculptor, painter, architect and poet, born at Caprese, in Tuscany, of the ancient family of the counts of Canossa. He studied drawing

under Domenico Ghirlandaio and sculpture under Bertoldo at Florence, and having attracted the notice of Lorenzo de' Medici, he was for several years an inmate of his household. When the Medici were sent into temporary disgrace and exile, Michelangelo, as one of their retainers, was forced to flee from Rome and took refuge in Bologna. In 1505 he was induced by Pope Julius II to settle in Rome. Here he sculptured the monument of the pontiff (including seven statues, among which was the famous one of *Moses*), now in the Church of Saint Pietro in Vincoli, and he painted the dome of the Sistine Chapel, his frescoes representing the creation and the principal events of sacred history. In 1530 he took a leading part in the defense of Florence against Charles V, being employed to build the fortifications around the city. Three years later he began his great picture in the Sistine Chapel, *The Last Judgment*, which occupied him eight years. His last considerable works in painting were two large pictures, the *Conversion of Saint Paul* and *The Crucifixion of Saint Peter*, in the Pauline Chapel. In sculpture he executed *The Descent of Christ from the Cross*, four figures, of one piece of marble. His statue of *Bacchus* was thought by Raphael to possess equal perfection with the masterpieces of Phidias and Praxiteles. As late as 1546 he was obliged to undertake the continuation of the building of Saint Peter's, by the order of Pope Paul III, and he planned and built the dome, but he did not live long enough to see his plan finished. Many alterations were made in it after his death. The remainder of his life was devoted chiefly to architecture. He undertook the building of the Piazza del Campidoglio (Capitol) of the Farnese Palace, besides many other edifices. His style in architecture is distinguished by grandeur and boldness, and in his ornaments the untamed character of his imagination frequently appears, preferring the uncommon to the simple and elegant. His poems, which he considered merely as pastimes, contain, likewise, convincing proof of his great genius.

Michelet, me shlay', JULES (1798–1874), a French historian and miscellaneous writer, born in Paris. In 1821 he was called to the chair of history in the Collège Rollin, where he was also professor of ancient languages and of philosophy till 1826. After the revolution of 1830 he was appointed chief of the historical section of the archives of France, and in 1838 he became professor of history at the Collège de France. He lost all his offices at the political change in 1851,

because he refused to take the oath of allegiance to Napoleon III. His principal historical works are *History of France*, *Introduction to Universal History* and *Beginnings of French Law*.

Michigan, *mish'i gan*, the WOLVERINE STATE, one of the north central states, consists of two peninsulas, the upper and the lower. The upper peninsula is bounded on the n. by Lake Superior, on the e. by the Saint Mary's River, on the s. by Wisconsin and lakes Huron and Michigan and on the w. by Wisconsin. The lower peninsula is bounded on the e. by Lake Huron, the Saint Clair River, Lake Saint Clair, the Detroit



MICHIGAN

- 1, Lansing; 2, Detroit; 3, Grand Rapids; 4, Bay City.
Dotted lines indicate chief railroads.

River and Lake Erie; on the s. by Ohio and Indiana, and on the w. by Lake Michigan, the northern terminus forming a point which is separated from the upper peninsula by the Straits of Mackinac. The greatest length of the upper peninsula from east to west is 318 miles, and from north to south, 164 miles. The greatest length of the lower peninsula from north to south is 277 miles, and from east to west, 187 miles. The area of the state, including about 200 islands, is 58,915 square miles, of which 1485 square miles are water. The coast line is about 1600 miles, being greater than that of any other state. The important projections are Keweenaw Peninsula, on the north, and the peninsula often known as the "Thumb," between Saginaw Bay and Lake Huron. The important indentations of the coast are Keweenaw Bay, east of Keweenaw Peninsula, and Whitefish Bay, at the head of Saint Mary's River, in Lake Superior; Green Bay and Grand

Traverse Bay, in Lake Michigan, and Saginaw Bay, in Lake Huron.

SURFACE AND DRAINAGE. The upper peninsula has a rough, hilly or mountainous surface. It does not contain any high peaks, but is characterized by unevenness of land and a thin, rocky soil, with a low degree of fertility. It is traversed by the Porcupine and the Mineral mountains, the highest elevation being Porcupine Mountain, which is 2023 feet in altitude. The lower peninsula is generally level or undulating, the highest land being found to the south-east and northwest of Saginaw Bay. There is no point in this peninsula that rises over 600 feet above the lake. A mere depression, through which flow the Saginaw and the Grand rivers, extends from Saginaw Bay to Grand Haven on Lake Michigan. This is nowhere more than 75 feet above the level of the lakes and probably in former times was covered with water. The surface of the lower peninsula is dotted with a large number of small, clear lakes, most of which are surrounded by forests and are noted for their beauty and for abundance of fish. It is estimated that there are more than 5000 such lakes within the state. Along Lake Michigan there are numerous high bluffs and sand dunes, and the streams in the southern part of the state flow through well-worn channels.

The rivers are all short and of comparatively small volume. The streams of the upper peninsula flowing into Lake Superior are obstructed with rapids and falls. In length and size they are comparatively unimportant. The other streams in this section are the Menominee, forming a part of the boundary between Michigan and Wisconsin, the Ontonagon, the Sturgeon and the Escanaba, which flow into Lake Michigan. The largest streams of the lower peninsula are the Raisin and the Huron, flowing into Lake Erie; the Saginaw, the Au Sable, the Thunder Bay and the Cheboygan, flowing into Lake Huron, and the Grand, the Kalamazoo, the Saint Joseph, the Muskegon and the Manistee, flowing into Lake Michigan.

CLIMATE. There is a marked difference between the climate of the southern part of the lower peninsula and that of the upper peninsula. The latter is in the region of a cool temperate climate. The summers are cool and the winters are severe, and this portion of the state is subject to very heavy falls of snow. The presence of the lakes equalizes the temperature of the lower peninsula and also exerts a marked influence on the rainfall. The southern half of

the lower peninsula has a mild climate during summer and winter, and that portion of the state bordering on Lake Michigan and extending as far north as Grand Traverse Bay is influenced by the southwest winds which prevail throughout the year. These winds equalize the temperature of this region, so that for a distance of from five to ten miles inland, damaging frosts seldom occur. Here the winters are never very cold nor the summers very warm, but farther inland the winters are as severe as in other parts of the state. These conditions are especially favorable to the growing of fruit, and this region constitutes the Michigan fruit belt. The average rainfall in the state is about 30 inches, and it is evenly distributed through the year, so that all sections have sufficient moisture for agricultural purposes.

MINERAL RESOURCES. The upper peninsula is one of the most important iron-producing regions of the world, ranking, in the amount of ore mined, second only to the Minnesota iron region, and in Keweenaw Peninsula are located the great copper mines, which for many years supplied nearly all of the copper produced in the United States and only recently have been out-ranked by the mines in Montana and Arizona (See COPPER; IRON). Michigan is also one of the leading states in the Union in the production of salt. The largest mines (locally called *salt blocks*) are around Saginaw Bay. The salt is obtained by passing water through the mines, to dissolve the salt, then evaporating the water, to secure the mineral. There are also large deposits of gypsum about Grand Rapids, and Michigan leads the Union in the production of this mineral. Numerous deposits of rock from which Portland cement is made are found throughout the state. Clay which is excellent for brick and tile and also suitable for pottery also occurs in many localities.

AGRICULTURE. The soil and climate of the southern half of the state are remarkably well suited to the growing of nearly all crops produced in the temperate climate. A region in the central part of the northern portion of this peninsula, however, contains light, sandy soil that is not particularly well suited to tillage. The leading crops are hay, corn, oats, wheat, potatoes and sugar beets. In the production of the latter, Michigan is the second state in the Union. In the fruit belt large quantities of apples, peaches, plums, cherries and small fruits are grown, the peach crop varying from 500,000 to 1,000,000 bushels a year. The

raising of live stock and dairying are also important branches of agriculture. The growing of particular crops in localities where soil is especially suited to them is a unique feature of the agriculture of this state. In some sections swamp lands which have been drained are especially suited to the raising of celery and peppermint. The largest peppermint farm in the world is in Allegan County, and in the manufacture of peppermint products Michigan leads the world.

MANUFACTURES. The manufactures of the state are very important. The northern half of the lower peninsula and much of the upper peninsula contain vast forests of pine and hard wood, and for years Michigan has been one of the leading lumber states in the Union. The presence of this lumber, with an abundance of water power, has enabled factories for the manufacture of lumber, doors, sash, furniture, wooden ware and such other articles as are made of lumber, to operate very successfully within the state, and Grand Rapids is one of the largest furniture manufacturing centers in the world. Other manufacturing industries of importance include the manufacture of carriages and wagons, stoves, engines, machinery, flour and other grist mill products, agricultural implements, cars and other railroad appliances. There are also large quantities of paper and wood pulp produced within the state, Kalamazoo being the chief center of this industry. Detroit is the largest manufacturing center, but the industries are distributed quite widely throughout the state and are the basis of many thriving towns.

TRANSPORTATION AND COMMERCE. Her extensive coast line has given Michigan many good harbors; she has greater facilities for water transportation than any other state, and the tonnage of Michigan ships exceeds that of any other state except New York. The southern half of the state also contains numerous trunk lines of railway, extending east and west and connecting at Detroit and Port Huron with Canadian lines. The upper portion of the lower peninsula has a number of lines extending north and south. The upper peninsula contains a number of lines extending east and west, with cross lines, so that the leading towns have railway communication.

The commerce of the state is extensive. The exports consist of lumber and its manufactured products; iron ore, salt, fruit and fish, the catching of which is an important industry.

The imports are such manufactured articles and food products as cannot be profitably made or raised.

GOVERNMENT. The legislature consists of 32 senators, elected from districts, and a house of representatives limited to 100 members. The members of each house are elected for two years. The legislature meets biennially and is not limited as to length of the session. The governor and lieutenant governor are elected for two years, as are the secretary of state, the treasurer, the auditor, the attorney-general and the superintendent of public instruction. The judicial department comprises a supreme court, consisting of eight justices, chosen by popular vote for eight years, and circuit courts, presided over by circuit judges elected for six years. Each county has a probate court, and justice courts are found in every township. The justices of the supreme court are required to reside at the state capital, and the justice whose term expires first is chief justice during his last year of service.

EDUCATION. The state maintains an efficient school system, under the supervision of a superintendent of public instruction. The schools for each county are in direct charge of a county school commissioner, elected for four years. There are also township boards of education of three members, and each school district has a board of five trustees for graded schools and three for ungraded schools. The number of members on city boards of education is fixed by the charters of the respective cities. The support of public schools is obtained from the state fund, from local taxation and from the sale of state school lands, of which there are still large areas. The State Normal College is located at Ypsilanti and was the first normal school established west of New York. Normal schools devoted to the preparation of teachers for the rural schools and for lower grades are at Mount Pleasant and Marquette. The state university, which is one of the best in the Union, is at Ann Arbor (See MICHIGAN, UNIVERSITY OF). The state agricultural college, located two miles east of Lansing, is under the management of the state board of agriculture, and the school of mines is located at Houghton. There are also a number of colleges and secondary schools in the state maintained by religious denominations. Among these are the Detroit College at Detroit, Albion College at Albion, Adrian College, Alma College, Hillsdale College, Kalamazoo College and Olivet College.

INSTITUTIONS. The state public school for dependent children is at Coldwater, the school for the deaf and dumb is at Flint and the school for the blind is at Lansing. The asylums for the insane are at Kalamazoo, Pontiac, Traverse City and Newberry. There is a home for the feeble-minded at Lapeer and a state soldiers' home at Grand Rapids. The penal institutions comprise the penitentiaries at Jackson and Marquette, a house of correction at Ionia, an industrial school for boys at Lansing and an industrial school for girls at Adrian.

CITIES. Detroit and Grand Rapids are the only large cities in the state, but there are a number of others which are important railroad and industrial centers. Chief among these are Lansing, the capital; Saginaw, Bay City, Jackson, Kalamazoo, Muskegon, Port Huron, Battle Creek and Manistee, in the lower peninsula; Laurium, Ishpeming, Marquette, Escanaba, Menominee, Hancock and Ironwood, in the upper peninsula, each of which is described under its title.

HISTORY. French Jesuit missionaries and traders had visited Michigan as early as 1610, but the first permanent settlement was founded at Sault Sainte Marie by Marquette and others in 1668. Numerous villages were soon established, and Detroit was founded in 1701. The territory made little progress under French occupation and in 1763 passed to the English by the Treaty of Paris. During Pontiac's War the garrison at Mackinac was massacred, and Detroit was besieged for over five months, but without success. In 1774 the territory was annexed to Quebec, but by the Treaty of Paris in 1783 it passed to the United States. Thereafter for several years the indians were restless, and they were not finally subdued until 1795. Michigan was for a time a part of the territory of Ohio and of Indiana, but was made a separate territory in June, 1805, with William Hull as governor. It was the scene of important operations during the War of 1812. A dispute with Ohio concerning a strip of land along the southern boundary of the state led to delay in the admission of Michigan to the Union, but the state was recognized January 26, 1837. After that time, for a number of years, the state was the victim of a spirit of speculation, which retarded its growth. The capital was removed from Detroit to Lansing in 1847. An amendment to the state constitution was adopted in 1853, prohibiting the manufacture and sale of intoxicating liquors, but this was repealed in

1876. During the Civil War Michigan contributed largely to the Union armies. Since that time the chief issues in state politics have been the taxation and regulation of corporations. The Republican party has usually controlled the state. Consult Cooley's *Michigan*, in the American Commonwealths Series.

Michigan, LAKE, the second largest of the great lakes of North America. It is wholly within the United States, having the State of Michigan on the east and northwest, Wisconsin and Illinois on the west and Indiana on the south. On the northeast it communicates with Lake Huron by the narrow Straits of Mackinac, and on the south with the Mississippi by the old Illinois and Michigan Canal and the new Chicago Drainage Canal. It is 350 miles long, on an average is 60 miles broad and has an area of 22,450 square miles. Its depth is about 870 feet, and its elevation above the sea, 581 feet. The largest island in the lake is in the northern portion, Beaver Island, 50 miles long. There are two large bays, Green Bay and Grand Traverse Bay. The largest rivers emptying into it are the Saint Joseph, the Muskegon, the Grand, the Kalamazoo and the Manistee. The chief ports are Chicago, Milwaukee, Escanaba and Grand Haven. The fisheries of this lake are very important. See GREAT LAKES.

Michigan, UNIVERSITY OF, a state university established at Ann Arbor in 1837, by act of legislature, and opened in 1841. As originally established, the charter provided for departments of literature, science and art, law and medicine; but as now organized, the following departments are maintained: Literature, science and arts, engineering, medicine and surgery, law, a school of pharmacy, a homeopathic medical college and a college of dental surgery. Each of these departments has several courses and is maintained on the broadest possible plans. The university has always been known for the thoroughness and high standard of its scholarship and the excellent equipment of its graduates. The affairs of each department are managed by the faculty of that department, and those pertaining to the university as a whole, by a senate, composed of members from each of the faculties. This is the first great university to provide for the education of women, becoming co-educational in 1870 and opening all departments to women on equal footing with men. The library contains over 130,000 volumes, besides pamphlets, and in addition to this it has

special medical and law libraries, which contain about 40,000 volumes. Besides the regular university buildings, there are gymnasiums for men and women, also an excellent observatory, donated by citizens of Detroit. The faculty numbers about 300, and the average enrollment is 4500.

Michigan City, IND., a city in Laporte co., on Lake Michigan, about 40 mi. e. of Chicago, on the Pere Marquette, the Michigan Central and other railroads. The transportation facilities are good, and there is an extensive trade in lumber, salt and iron ore. The manufactures include railroad cars, chairs, glass, hosiery, knit goods, lumber and lumber products. The Northern Indiana State Prison is located here, also a United States life-saving station. There are a number of large, interesting sand dunes along the lake shore. It is a popular summer resort. The place was laid out in 1832 and was incorporated five years later. Population in 1900, 14,850.

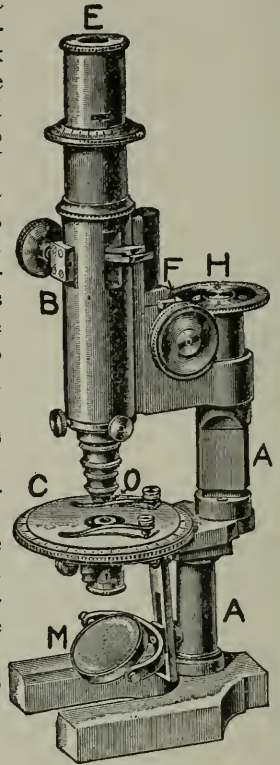
Mi'crobe. See BACTERIA AND BACTERIOLOGY.

Microm'eter, an instrument used with a telescope or microscope for measuring very small distances. There are several patterns of micrometer, but the one in most common use consists of a circle divided into squares by cob-web threads. The number of squares covered by the object enables the observer to determine its size. Micrometers on surveyors' instruments usually measure distances by means of a screw with a very fine thread. The turning of the screw moves a plate, and the distance moved is known by the number of turns given the screw.

Mi'crophone, an instrument to make faint sounds more audible, invented by Mr. Hughes in 1878. The most sensitive conductor of sound is willow charcoal, dipped when at white-heat into a bath of mercury. A piece of charcoal, thus prepared, placed vertically between two carbon blocks, which are connected with a telephone, is a common form of microphone and magnifies sounds otherwise inaudible. A perfect instrument will enable one to hear the patter of a fly's feet when the insect is walking across the disk.

Mi'croscope, an instrument for obtaining a highly magnified image of a very small object. The simple microscope consists of a double convex lens, which is placed between the object and the eye. It is usually known as a magnifying glass (See LENS). The compound microscope

consists of a stand, *A*, upon which are mounted two tubes, *B*, so fitted that one will slide within the other; a stage, *C*, which holds the object, and under which is a small mirror, *M*, for reflecting the light upon the object. The tube contains the object glass, *O*, and the eyepiece, *E*. The rack and pinion, *F*, enable the tube to be raised and lowered so as to focus the object. *H* is a screw having a very fine thread, which can be used when a delicate adjustment of the focus is required. If the microscope has two tubes, so arranged that it can be used with both eyes, it is called a *binocular*. The magnifying power of the microscope depends upon the power of the object glass and of the eyepiece and the distance between these lenses. The object glass forms a magnified image of the object, and the eye glass can magnify this. By extending the tube so as to increase the distance between the eye glass and the object glass, the power of the microscope is quite materially increased.



COMPOUND MICROSCOPE

Mi'das, in Greek and Roman mythology, a Phrygian king. One legend tells that in punishment for having decided a musical contest between Pan and Apollo in favor of Pan, he was given ass's ears by Apollo. This deformity he concealed from all except his barber, whom he compelled to swear to tell no man. The barber, however, unable to keep the secret to himself, dug a hole in the earth, into which he whispered it; soon after, reeds grew up over the spot and, as they rustled, announced to all who passed by, "King Midas has ass's ears; King Midas has ass's ears." Another story tells that Midas, having captured Silenus, the companion of Bacchus, returned him to Bacchus and as a reward was promised any gift he might

ask. Midas petitioned that he might have the gift of turning everything he touched to gold, and his request was granted. He soon found, however, that this strange ability brought with it great inconvenience, as all of his food and drink turned to solid or molten gold as soon as it touched his lips. Moved by his distress, Bacchus instructed him to bathe in a certain river, and the golden touch left him.

Middle Ages, a term applied loosely to that period in European history which lies between the ancient and modern civilizations. With some writers the period is considered to begin when the Western Roman Empire was overthrown by Odoacer, in 476; with others when Charlemagne was crowned emperor of the West, in 800; some place its beginning at the death of Charlemagne, while yet others make it begin when the Frankish Empire ended, in 843. The period is variously conceived to have closed with the Reformation in Germany; with the discovery of America by Columbus; with the invention of printing, and with the end of the Thirty Years' War in the Peace of Westphalia (1648). The first part of this period, from the fall of the Roman Empire to the beginning of the Revival of Learning, in the twelfth century, is usually called the Dark Ages, on account of the decline of civilization during the period and the extinction of almost all progressive influences.

Mid'dleboro, MASS., a town in Plymouth co., 30 mi. s. of Boston, on the Nemasket River and on the New York, New Haven & Hartford railroad. It has a picturesque location and is a popular summer resort. The river has three falls and furnishes good water power for the factories, which include establishments for the manufacture of woolen goods, shoes, lumber, marble and foundry and machine shop products. Middleboro was settled on the site of the Indian village Nemasket about 1662 and was incorporated in 1669. Population in 1905, 6888.

Middlesbrough, *mid'dlz b'ruh*, a seaport of England, situated at the mouth of the Tees, 48 mi. e. n. e. of York. The city has broad streets, a beautiful park and excellent public buildings. It is in the midst of the Cleveland iron district, and its industries consist of smelting furnaces and foundries, the manufacture of railway rails, locomotives, boilers and other machinery. The iron trade is carried on on an extensive scale. There are also factories for the manufacture of pottery and chemical works. Salt is obtained from wells. The harbor is

good, and there is an extensive wharf protected by a breakwater. Population in 1901, 91,302.

Mid'dletown, CONN., the county-seat of Middlesex co., 18 mi. s. of Hartford, on the Connecticut River and on the New York, New Haven & Hartford railroad. The city is in an agricultural region where tobacco is the principal product. The leading manufactures are bone, cotton, rubber and silk goods, pumps, harness and hardware. Wesleyan University, Berkeley Divinity School, the state hospital for the insane and the state industrial school for girls are located here. The place was settled in 1650 and was incorporated the next year as the town of Mattabeseck. It was given its present name two years later and was chartered as a city in 1784. Population in 1900, 9589.

Middletown, N. Y., a city in Orange co., 67 mi. n. w. of New York City, on the Erie, the New York, Ontario & Western and other railroads. It is in an agricultural and dairying district, has a considerable trade in farm products and contains hat factories, car shops, cigar factories, glass works and other establishments. The state homeopathic hospital for the insane is located here, and the city has the Thrall Public Library and a fine high school building. The place was settled before the Revolution and was named from its central location, halfway between Montgomery and Mount Hope, and between the Hudson and the Delaware rivers. Population in 1905, 14,516.

Middletown, OHIO, a city in Butler co., 35 mi. n. of Cincinnati, on the Miami River and the Miami & Erie Canal and on the Cincinnati, Hamilton & Dayton, the Cleveland, Cincinnati, Chicago & Saint Louis and other railroads. There are extensive manufactures of tobacco, paper, bicycles, agricultural implements and other articles. The city has a fine opera house and a Masonic Temple. Middletown was settled in 1794. Population in 1900, 9215.

Middletown, PA., a borough in Dauphin co., 9 mi. s. e. of Harrisburg, on the Susquehanna River and on the Pennsylvania and the Philadelphia & Reading railroads. It is in a farming region and contains flour and planing mills, tanneries, stone quarries, iron furnaces, stove works, car shops and other factories. It was settled in 1756 and was made a borough in 1828. Population in 1900, 5608.

Mid'ianites, an Arabian tribe, represented in the Old Testament as the descendants of Midian, son of Abraham by Keturah, and described as engaged at an early period in a commerce with

Egypt. They dwelt in the land of Moab, to the southeast of Canaan.

Mifflin, THOMAS (1744-1800), an American soldier and statesman, born at Philadelphia. He was elected to the colonial legislature and in 1774 became a delegate to the Continental Congress. He fought in the Revolutionary War, attaining the rank of major general, and was appointed to be member of the board of war. He became dissatisfied with Washington's policy, however, and was prominent in the intrigues of the Conway Cabal (See CONWAY CABAL). He was replaced by General Greene as quartermaster-general, in March, 1778, and in the following October he retired from the board of war. In 1782 he was elected to Congress and became its president, but three years later he returned to his state, entered the legislature, was sent as a delegate to the Federal constitutional convention and from 1790 to 1799 was governor of Pennsylvania.

Mignonette, *min yun et'*, a flower that is cultivated almost everywhere in gardens during the summer and as a house plant in winter. Its smooth leaves are entire or divided into three parts, and the small, rather unattractive flowers are borne in clusters at the end of the stem. The chief charm of the plant is its fragrance.

Migration of Animals. Certain animals move either periodically or at irregular times and seasons from one locality to another, sometimes far distant. Occasionally migrations are caused by failure of food or some other condition which forces the animals to leave the region where they are living. The inroads which the Rocky Mountain locusts have made in the United States and the plagues of flies and other insects which have appeared in the East have been owing to this cause. The chinch bug and the army worm are other insects that migrate in search of food and make no effort to return to their original home. This is true also of the peculiar migration of the European lemmings, small, mouse-like animals which, every few years, in vast numbers leave their home in the extreme northern part of Europe and travel at night toward the south and west until they are exterminated.

It is to birds, however, that we must look for the most regular and perfect example of migration. Before food supplies have failed in the warmer parts of the South, many of its birds leave for the North, sometimes traveling several thousand miles and terminating their journey with the region in which they nest. At the approach of cold weather, they return again

South, where they spend the winter. In the United States this migration may be said to begin early in February, with the approach of the robin and bluebird, but it does not reach its height until toward the middle of May. The earliest birds come as soon as the weather is warm, with little attention to the season. From then on, the number of species traveling north increases steadily, growing more and more definite in point of time; in fact, the date of the arrival of the warblers and other late species is known almost to a day. The enormous numbers of these migrating birds, the regularity of their departure and return, the long distances they cover in flight without rest, are among the marvelous things of nature. Many birds migrate openly in the day time, but the large flocks of more timid birds fly only at night, and feed during the day in retired places. Year after year the general routes of migration are the same, following the seacoast and the great water courses until the birds reach their chosen location, when they distribute themselves in all directions. During the spring migration the male birds don their brilliant spring plumage and are easily recognized, but on their return in the fall they are duller in color and are accompanied by the females and the young, also in plumage less easily recognized, so that the fall migration never attracts as much attention as does that of the spring. Not all species of birds are migrants; in fact, the larger number are not. Those which do migrate are confined to a few groups of high organization, who feed largely upon worms and insects, or who use them as food for their young, or who depend for food upon the wet places that are closed by frost.

Mil'an, or *mil lan'*, the largest city of Lombardy, and the second city of Italy, capital of the province of its own name, situated on the small river Olona in the middle of the plain between the Adda and the Ticino. The city is entered by a number of gates, several of which are magnificent, and the leading streets proceeding from these gates are tolerably wide, well-paved and lighted. The chief open square and the center of the life of the city is the Piazza del Duoma (Cathedral Square), in which is located the celebrated cathedral which, after Saint Peter's at Rome, is the largest church of Europe (See MILAN CATHEDRAL). Among the other noteworthy buildings are the Church of Sant' Ambrogio, built on the site of a church founded by Saint Ambrose in the fourth century; the Church of Sant' Eustorgio; the Church of Santa Maria

delle Grazie, in the refectory of which is the celebrated *Last Supper* of Leonardo da Vinci; the royal palace; the archiepiscopal palace; the palace of arts and sciences, with a library of 230,000 volumes and a magnificent collection of pictures, and the Ambrosian Library. The manufactures of Milan include silks, cottons, lace, carpets, hats, earthenware, jewelry, gloves and art furniture.

The first distinct notice of Milan occurs in 222 B. C., when it was subdued by the Romans. In the third century A. D. it was second in rank to Rome, and at the close of that century it was made the capital of Italy by Diocletian. In the twelfth century it was the strongest of the city republics and had acquired the leadership of the other cities, and two centuries later it was made a duchy for the family of the Visconti, who gradually became supreme over almost all of Lombardy. Among the most famous rulers of the city were the Sforzas. On the extinction of the Sforza dynasty, Charles V united Milan with Spain. In the early eighteenth century it was ceded to Austria, and under Napoleon it became the capital, first of the Cisalpine Republic and then of the Napoleonic kingdom of Italy. It was restored in 1815 to Austria, from whose rule it was freed only after the Battle of Magenta in 1859. With the rest of Lombardy it was surrendered to Sardinia and became part of United Italy. Population in 1901, 491,460.

Milan Cathedral, a famous Gothic cathedral in Milan, inferior in size to Saint Peter's at Rome, but in some respects a close rival. Its foundation was laid in 1386 by Gian Galeazzo Visconti, and many of the greatest European architects were employed in its erection. It is built of white Carrara marble, in the form of a cross, with a length of 486 feet and a breadth of 287 feet. The height of the tower is 356 feet. There are 98 pinnacles and more than 2000 statues. Within it Napoleon was crowned king of Italy in 1805. The view of the Alps, Lombardy and the city from the top of the cathedral is very beautiful.

Milburn, WILLIAM HENRY (1823-1903), an American clergyman, born in Philadelphia and educated at Illinois College. He was a member of the Methodist Church and had circuits in Illinois and some of the Southern states. In 1865 he was ordained deacon in the Episcopal Church, but returned to the Methodists in 1871. He served several terms as chaplain of the House of Representatives and from 1893 to 1902 was chaplain of the Senate. Milburn lost

the sight of one eye when a boy and finally became blind.

Mil'dews, the name of a number of plant diseases, caused by parasitic fungi, and also powdery spots on cloth, paper, leather and other substances. In the United States there are two classes, the true, or powdery, mildews, and the false, or downy, mildews, each due to fungi of different orders. The former live on the surface of flowers, stems and leaves and send minute suckers down into the tissues, thus absorbing the nourishment and often causing the death of the plant. There are about one hundred fifty species, which attack almost every kind of plant. Downy mildews form within the tissues of the host and grow outwards, appearing on the outside only to shed the spores. The spores are one-celled, are readily blown about by the wind and spread rapidly. Some of the most injurious of plant parasites are among the downy mildews.

Mile, a measure of length or distance in the English system, now used throughout the United States and Great Britain and their possessions and formerly in all Europe. The English statute mile (also of the United States) contains 8 furlongs, each of 40 rods, poles or perches, of $5\frac{1}{2}$ yards each. The statute mile is therefore 1760 yards, or 5280 feet. It is also 80 surveying chains, of 22 yards each. The square mile is 6400 square chains, or 640 acres. The Roman mile was 1000 paces (*mille passuum*), each of 5 feet; and a Roman foot being equal to 11.62 modern English inches, it follows that the ancient Roman mile was equal to 1614 English yards, or nearly eleven-twelfths of an English statute mile. The geographical, or nautical, mile is the sixtieth part of a degree of latitude, that is, 6080 feet, or about 2027 yards.

Miles, NELSON APPLETON (1839-), an American soldier, born at Westminster, Mass. He entered the Federal army in 1861 and was promoted through all the grades to be major general. After the Civil War he conducted several Indian campaigns in the west, notably that against the Apaches under Geronimo in 1886. He succeeded to the full command of the United States army in 1895 and was in supreme control during the Spanish-American War. In 1900 he was raised to the rank of lieutenant general and retired three years later. In 1905 he accepted a temporary appointment as commandant of the Massachusetts militia, on the staff of the governor. (See portrait on next page.)

Mile'tus, an ancient city of Ionia in Asia Minor, at the mouth of the Maeander River. It had an extensive trade, and its manufactures of woolen goods were famous. When the Ionian colonies revolted against Persia, Miletus took a prominent part and was consequently destroyed by the Persians in 494 B. C. It was restored later to a certain extent and joined Athens against Sparta in the Peloponnesian War. Saint Paul visited the city once or twice.

Mil'ford, MASS., a town in Worcester co., 18 mi. s. e. of Worcester, on the Charles River and on the Boston & Albany and the New York, New Haven & Hartford railroads. It is



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an important manufacturing center, producing boots, shoes, straw goods, silk, machinery and other articles. There are also extensive quarries of granite. The town has a fine high school building and a memorial hall containing the public library. It was settled in 1669 and was made a separate town in 1780. Population in 1905, 12,105.

Mil'itary Acad'emy, UNITED STATES, the national institution for the education of officers for the United States army, established at West Point, N. Y., by act of Congress in 1802. Washington, Hamilton and others who had been officers in the American army strongly advocated the establishment of such a school imme-

diately after the Revolutionary War, though little was done with their recommendations previous to 1802. Another act of 1808 increased the powers of the school and provided for a larger number of cadets. The lack of officers during the War of 1812 showed clearly the necessity of a military school with ample provisions for giving a thorough course of study and training. The school was thoroughly reorganized under the supervision of Major Sylvanus Thayer, whose system, with few changes, has continued until the present time.

The corps of cadets consists of one from each congressional district, one from each territory, one from the District of Columbia, one from Porto Rico, two from each state at large and forty from the United States at large. All of these cadets must be residents of the congressional or territorial district or the District of Columbia or of the states, respectively, from which they are appointed. Appointments are made by the president of the United States, through recommendations of Congressmen, the successful candidate being selected by competitive examination. These examinations are held the first of May each year in the districts and states where vacancies occur. The candidates are required to pass an examination in English, geography, American history and the elements of mathematics, and in addition, they must undergo a very strenuous physical examination. The course requires four years. Each cadet is allowed \$500 a year and one ration a day and is prohibited from receiving any money or supplies from home or from friends.

The direct management of the academy is vested in a superintendent, who is an army officer and who has associated with him about eighty instructors, also army officers. A few of these positions are permanent, but the instructors in military science and tactics are detailed every four years by the secretary of war. Instruction in the academy is characterized by thoroughness. The classes are divided into sections of about ten, and each cadet recites every day in the subjects which he pursues. Great stress is laid upon promptness, truthfulness and the formation of a high standard of character. The cadet is allowed a furlough at the end of his first two years' residence, but with this exception he does not come in contact with the outside world during his entire course. The result of all these provisions is that the American army has officers that are equal to those of any other army in the world.

The academy is beautifully situated on bluffs overlooking the Hudson River. In 1903 \$5,500,000 was appropriated for new buildings and for the remodeling of the old structures, so that the equipment is now one of the finest in the world. See WEST POINT; ARMY, subhead *United States Army*.

Militia, *mil lish'a*, a body of armed citizens, regularly trained, though not in constant service in time of peace. The term applies to the English reserve force, or *second line*, and to what is known as the *national guard*, in the United States (See ARMY). In the United States the militia consists of able-bodied male citizens between the ages of 18 and 45 years, with certain exceptions, which are provided for by national and state laws. Their number exceeds 14,000,000. The term militia also applies to certain organized bodies of state troops, which since the beginning of the Revolution have really been the country's chief defense. In time of need they enlist under national command; but the differences of state control have led to some confusion and no little difficulty in assimilating the various bodies. Accordingly, in 1903 the United States made an attempt to influence the organization of the militia, but it could be only advisory, as the control of the militia is vested by the Constitution in the separate states.

Several of the states have organized companies of naval militia which have been given some training and which are expected to command the coast and harbor defense vessels in time of war and so release the regulars for service at sea. In 1901 there were about 5000 officers and men in the different states.

Milk, a fluid secreted by the females of mammals for nourishing their young. It is produced in quantity by sheep, goats and cows, but cows' milk is the only kind used commercially in the United States. On account of its nourishing qualities, milk is extensively used as an article of food.

When examined by the microscope, milk is seen to consist of a clear fluid containing many minute globules of fat. These are so small that about one million of them are contained in a pint of milk. They constitute the cream. One hundred pounds of good milk contain 87 pounds of water, 4 pounds of fat, 5 pounds of milk sugar, about $1\frac{1}{2}$ pounds of casein and albumen and a small quantity of mineral matter. The cream can be separated either by allowing the milk to stand for a few hours in a cool place or by the cream separator. It requires $5\frac{1}{2}$ gallons

of good milk to produce a gallon of cream, $3\frac{1}{2}$ gallons to make a pound of butter, and about $1\frac{1}{2}$ gallons to make a pound of cheese. See SEPARATOR, CREAM.

Milk is very sensitive to the influence of its surroundings, and from the moment it is drawn from the cow it begins to change. It absorbs odors from the stable, from vegetables, meats and cellars, and because of this the greatest care is necessary in keeping it free from all such influences. When drawn it should be immediately cooled to a temperature of 45° and kept at that temperature by placing it in cans set in cold water or packed in ice. In well conducted dairies all these points are given special attention, and proper apparatus for preserving the milk in the best possible condition is provided. The animals, the stable, the utensils and attendants of a dairy should be kept scrupulously clean; otherwise, however good the quality, the milk will reach the consumer in a tainted condition.

It is estimated that the quantity of milk used in the United States each day is equal to a tumblerful for every man, woman and child in the country. Dairy farms in the vicinity of large cities are usually devoted to producing milk for city use, and the cows are of those breeds which will produce the largest quantity of milk without regard to its richness. The proper handling of this milk requires that it be kept cool and either bottled in the country or shipped to the city in cans which are tightly covered and packed in ice. On reaching its destination it should be bottled as quickly as possible, to exclude the air from it. The bottles should then be kept on ice until the milk is distributed for use. Dairy farms remote from cities are devoted to the manufacture of butter or cheese, and their herds are usually of those breeds which combine richness in milk with quantity.

Milk is often adulterated by adding water, by removing a part of the cream and adding water with chalk or other substances and by the addition of preservatives. For these reasons the sale of milk in large cities is usually regulated by the department of public health, which maintains inspectors who frequently test the quality of the product placed on the market by different dealers. See BUTTER; CHEESE; CREAMERY.

Milk, CONDENSED, milk preserved by partially evaporating it and sealing the product in tin cans. The milk is brought to the factory and placed in large storage tanks, from which it is drawn off into copper tanks, each having a

capacity of about 1000 gallons. The milk is brought by steam heat to a boiling point and is then drawn off and strained into the sugar mixer, where the proper proportion of granulated sugar is added. The sugar is the preservative which keeps the milk sweet under all circumstances. The milk is then taken to the vacuum pans, where it is boiled down until three-fourths of the water is evaporated. It requires a temperature of 140° to evaporate the milk in the vacuum pans, and the reduction is rapid.

The condensed milk, a thick, pasty, cream-colored custard, is drawn from the vacuum pans and taken to the coolers, from which it is taken to the packing room and put into little air-tight cans. See DAIRYING; MILK.

Milk Snake or House Snake, a snake common in North America, where it often enters barns and other buildings in search of mice, which constitute its principal food. Though it is quick and alert, it is entirely harmless. Its name is derived from the belief that it enters dairies and drinks the milk and even that it sucks it from cows. The snake is yellowish white beneath, somewhat darker above, its back being covered with numerous black blotches.

Milkweed, the name of a family of herbs that have curiously complicated little flowers, and whose pods are filled with flat seeds, each bearing a tuft of silky down. The plants take their name from their thick and milky juice. In the tropics some members of the family are climbers and are cultivated for their beautiful flowers. The common milkweed is found in the United States in fields and lowlands from New York west to Nebraska. The stems, which are about four feet high, are downy; the leaves are pale, and the numerous purplish flowers grow in clusters at the end of a stalk. The flowers have a sweet, sickening odor. As the plant is propagated both by its seeds and by its creeping roots, it becomes a troublesome weed, which is best eradicated by heavy cultivation. See BUTTERFLY WEED.

Milky Way or Galaxy, that long, luminous track which is seen at night stretching across the heavens from horizon to horizon and which, when fully traced, is found to encompass the heavenly sphere like a girdle. This luminous appearance is occasioned by a multitude of stars, so distant and blended as to be distinguishable only by the most powerful telescopes. At one part of its course it divides into two great branches, which remain apart for a distance of

150° and then reunite. In many places smaller branches are given off. At one point it spreads out very widely, exhibiting a fan-like expanse of interlacing branches, nearly 20° broad; this terminates abruptly and leaves a kind of gap. At several points are seen dark spots in the midst of some of the brightest portions; one of the most easily distinguished of these dark spots has long been known as the "coal sack."

Mill, JAMES (1773-1839), a British philosopher and economist. He began his *History of British India* in 1806 and published it in 1818. In consequence of the knowledge which his researches had given him of Indian affairs, he was appointed assistant examiner of correspondence by the East India Company and soon afterward became chief examiner. He wrote articles on social and political subjects for the *Encyclopedia Britannica*; published a treatise on the *Elements of Political Economy*, written largely as an educational work for his son, John Stuart Mill, and an able *Analysis of the Human Mind*.

Mill, JOHN STUART (1806-1873), an English philosopher, born in London. At the age of fourteen he entered upon a course of political economy. His fifteenth year was spent in France; on his return he studied law for a time, and in 1823 he obtained a clerkship in the East India Company, remaining in the company's employment till 1858. He was elected to Parliament in 1865 as member for Westminster and used his influence on the side of the advanced Radicals. From 1835 to 1840 he was principal conductor of the *London and Westminster Review*, in which were published many of his own articles. In 1843 appeared the first of his two chief works, *A System of Logic, Ratiocinative and Inductive*, the second, *Principles of Political Economy*, appearing five years later. To these he afterward added *On Liberty*; *Utilitarianism*; the *Examination of Sir William Hamilton's Philosophy*, and a *Study of Auguste Comte and Positivism*. Mill's works on logic and political economy are standard text-books.

Millais, mil lay', JOHN EVERETT, Sir (1829-1896), an English painter, born at Southampton. In his earlier days he was a leader of the Pre-Raphaelite school, but on attaining maturity in art he abandoned the peculiarities for which the school is noted. He drew his subjects from all sources, using landscape, scriptural, mythological and genre themes. Among his best works are *The Huguenot Lovers*, *The Boy Princes in the Tower*, *Spring*, *Chill October*, *Ferdinand Lured by Ariel*, *Mariana in the Moated Grange*

and *Ophelia*. In portraiture Millais held first rank and painted a number of the most distinguished men of his day. He was made a member of the Royal Academy in 1883, became a baronet in 1885 and was decorated with the Legion of Honor.

Miller, CINCINNATUS HEINE (1841-), an American poet, better known as Joaquin Miller. He was born in Indiana, but went west with his father at an early age and spent some time in the California mining districts. For five years he lived among the Modoc Indians, and after that he attempted with little success to practice law in Idaho. In 1863 he undertook the management of the *Democratic Register*, published at Eugene, Oregon, but the paper was soon suppressed. He was called to the bar in Oregon and became district judge in Canyon City. After 1870 he lived at different times in New York, Washington and Oakland, Cal. Miller's first volume of poems, *Songs of the Sierras*, attracted considerably more notice in Europe than it did in the United States. Among his other works are *Songs of the Sun Lands*, *Songs of the Mexican Seas* and several novels. His poems show descriptive and some dramatic power, but lack true artistic form.

Miller, HUGH (1802-1856), a Scotch geologist, born at Cromarty, Scotland. While working at the trade of stone masonry, he studied literature and devoted all his spare time to geological research and to writing. Among his important works are *Old Red Sandstone, or New Walks in an Old Field*; *The Footprints of the Creator*, and *Testimony of the Rocks*. Miller's works have stood the test of time and are considered standard.

Miller. JOAQUIN. See MILLER, CINCINNATUS HEINE.

Mil'let, the common name for various species of grasses that produce roundish grains. The millets have been valued forage crops for centuries, and in many parts of the East they are important sources of food supplies. In India and Japan it has been estimated that more than 35,000,000 bushels of seed are planted annually. In the United States millet is raised as a forage plant and to some extent as a food for poultry. For illustration of another species, see GRAINS, color plate, Fig. 2.

Millet, *mil lay'*, JEAN FRANÇOIS (1814-1875), a French artist, born at Gruchy, near Cherbourg. He worked with his peasant father in the fields until he was eighteen years old. After this he studied drawing at Cher-

bourg and Paris, living in great poverty. It was not until he was thirty-five years old that he could do more than support himself by the sale of small pictures, but towards the end of his life he reaped the rewards of his steadfast perseverance. In 1849 he left Paris and settled among the peasants of Barbizon, on the edge of Fontainebleau Forest, and devoted himself to transferring their simple, everyday life to his canvases, which he did with great truth of sentiment and poetic charm.

Of his paintings may be mentioned *The Sheep Shearers*; *The Gleaners*, probably his masterpiece; *The Sower*; *The Shepherdess with Her Flock*, and *The Angelus*. The last was sold by auction in Paris in 1889 for about \$115,000.

Mills, ROGER QUARLES (1832-), an American lawyer and

politician, born in Todd County, Ky. He removed to Texas in 1849, studied law and was admitted to the bar at twenty years of age, beginning practice at Corsicana in 1852. He was elected to the state legislature in 1859 and entered the Confederate army, serving with distinction at Wilson's Creek, Chickamauga, Missionary Ridge and Atlanta. In 1873 he was elected to the House of Representatives as a Democrat, retaining his seat until 1892, when he was elected United States senator.

Mill Springs, BATTLE OF, a Battle of the Civil War, fought at Mill Springs, Ky., Jan. 19, 1862, between 4000 Federals, under General Thomas, and about an equal Confederate force, under General George B. Crittenden. The attack was begun by the Confederates, but after a desperate conflict they were repulsed and driven from the field. The battle was also



MILLET

called the Battle of Fishing Creek. A national cemetery has been established on the battle-ground.

Mill'vale, PA., a borough in Allegheny co., on the Allegheny River, opposite Pittsburg, and on the Pennsylvania, the Pittsburg & Western and other railroads. It is an industrial suburb of Pittsburg and contains lumber mills, iron and steel works, breweries and other factories. Population in 1900, 6736.

Mill'ville, N. J., a city in Cumberland co., 40 mi. s. of Philadelphia, on the Pennsylvania railroad and on the Maurice River. It is a manufacturing place, containing glass works, iron foundries, copper mills and other factories. The city has a large public park at Union Lake and contains a fine high school building and city and school libraries. It was made a town in 1801 and became a city in 1866. Population in 1905, 11,884.

Mi'lo. See MELOS.

Milreis, *mil rees'*, or **Milrea**, *mil re'*, the monetary unit of Portugal and Brazil, its value in the system of the former being about \$1.08 of United States money, and in that of the latter, about 55 cents. In both cases it is divided into one thousand *reis*, and coins in multiples of both the unit and of the subdivisions are issued in both gold and silver.

Miltiades, *mil ti' a deez*, (?-500 B. C.), an Athenian general. When Greece was invaded by the Persians, he was elected one of the ten generals and drew up his army on the field of Marathon, 490 B. C., where he gained a memorable victory. In the following year he persuaded the Greeks to entrust him with a fleet of seventy vessels, in order to follow up his success. With this, to gratify a private revenge, he attacked the island of Paros, but was repulsed and dangerously wounded. On his return to Athens he was impeached and was condemned to pay a fine of fifty talents. Being unable to pay, he was thrown into prison, where he soon after died of his wound.

Mil'ton, MASS., a town in Norfolk co., 6 mi. s. of Boston, on the Neponset River and on the New York, New Haven & Hartford railroad. It is a residence suburb of Boston and contains chocolate, paper and granite works, bakeries and other factories. The town has the Milton Academy, a public library, a bank, Milton Convalescent Home and a United States meteorological bureau and observatory. It was settled in 1637 and was made a separate town in 1662. Population in 1905, including several villages, 7054.

Milton, PA., a borough in Northumberland co., 67 mi. n. of Harrisburg, on the Susquehanna River and the Pennsylvania Canal and on the Pennsylvania and the Philadelphia & Reading railroads. The various industrial establishments include carriage works, rolling, flour, knitting and lumber mills, besides manufactures of woodworking machinery, furniture and other articles. It has a public park and a fine bridge across the river. The place was settled in 1768. Population in 1900, 6175.

Milton, JOHN (1608-1674), an English poet, second only to Shakespeare in rank. He was born in London. His earliest education was



JOHN MILTON

received from his father and from private tutors, but in 1620 he was sent to Saint Paul's School. There he studied ancient and modern languages, and there he became acquainted with Spenser's writings, which influenced him greatly. At the age of seventeen he entered Christ's College, Cambridge, where he remained for seven years. His *Hymn on the Nativity* was written during his university days. Leaving the university, he went to live with his father, who had retired to Horton in Buckinghamshire, and there he remained for six years. In this retreat he studied classical literature, philosophy, mathematics and music, and he wrote the four poems which are regarded as his most perfect work and as ranking with the greatest lyrics in the language. These are *L'Allegro* and *Il Penseroso*, the masque *Comus* and the elegy *Lycidas*.

In 1637, on the death of his mother, Milton made a Continental journey, in which he visited Paris, where he was introduced to Grotius; Florence, where he met Galileo; Rome, and Naples. Hearing while in Italy that civil war was threatening in England, he returned at once. The home at Horton had been broken up, and Milton settled in London, where he undertook the education of his two nephews, the sons of his sister, and the sons of a few personal friends. Before long he was drawn into the ecclesiastical struggle which was raging, and one treatise after another in defense of the Puritans came from his pen. In the summer of 1643 Milton married Mary Powell, the daughter of a royalist family, but she found his habits austere and his house dull and returned to her father about a month after marriage. In 1645, however, she returned and continued to live with him until her death in 1652.

When, in 1649, Charles I was executed and a republic established, Milton avowed his adherence to it in a pamphlet, *Tenure of Kings and Magistrates*, and was appointed foreign secretary to the commonwealth. In his literary work his eyesight suffered so much that in 1652 he became totally blind. Nevertheless, he continued Latin secretary, with the assistance of Andrew Marvell, and dictated some of Cromwell's most important dispatches. When Charles II was restored a few months later, the blind politician remained in hiding, his books were burned by the common hangman and he himself narrowly escaped the scaffold. He had married a second wife in 1656, who died in 1658, and in 1663 he married a third time. The last years of his life were spent in seclusion, in the composition of his greatest work, *Paradise Lost*. Blind as he was, his daughters were called on to read to him and to take down his verses, and they accepted the task in no pleasant spirit. They were disrespectful to him, sold his books by stealth and grumbled over his third marriage. Above all these troubles, however, Milton rose triumphant, and his great epic contains many passages which have never been surpassed in English poetry. *Paradise Lost* was published in 1667, *Paradise Regained* and *Samson Agonistes*, a tragedy, in 1671. Besides these works, Milton wrote a number of beautiful sonnets, the one *On His Blindness*, perhaps, the best-known of all English sonnets. His prose writings, though elegant in style, are often violent in tone, and they have, moreover, little of interest in the present day. *Areopagitica*, a defense of

the freedom of the press, is the best of his prose writings.

Milwau'kee, Wis., the county-seat of Milwaukee co. and the chief city of Wisconsin, is a port of entry situated on Lake Michigan, 85 mi. n. of Chicago and 83 mi. e. of Madison, the capital of the state. The abrupt shores of the lake at this point are from 80 to 125 feet high and are cut by the Milwaukee River, which forms a part of the splendid harbor. The Menominee and the Kinnickinnic, two small streams which flow into the Milwaukee River within the city limits, aid in making the location more picturesque. All these natural advantages have been considered in the building of the city, and the result is that Milwaukee has become one of the handsomest cities of the northwest. Its shape is that of an irregular rectangle, and it covers about 22 square miles. The plan is quite regular, the streets are broad and many miles of them are finely paved and laid with asphalt. The business part of the city is near the lake, while the best residence sections crown the hills and ridges. A system of electric railways affords ready communication between all parts of the city and extends into the suburbs and to attractive resorts along the lake and in the interior of the state. Three great viaducts span the valleys, and the rivers are well bridged. The Chicago, Milwaukee & Saint Paul, the Chicago & Northwestern and the Wisconsin Central railroads have lines extending into the city, and the first two have fine depots. The Pere Marquette has boat connection with the city.

Lake Park, which contains about 124 acres, is laid out with drives and walks. It is located in the northwest part of the city, on the lake shore. Juneau Park, a small tract on the lake front, contains a statue of Leif Ericson and another of Solomon Juneau, the founder of the city. Washington Park, on the west side, contains about 148 acres, and the eight or ten smaller parks here and there in the city bring the total park area to about 500 acres. Milwaukee has a number of fine buildings, and the general appearance of the city is neat and attractive. The Milwaukee brick, which have been widely used, are famous everywhere for their light cream color. Among the public buildings are the United States government building, the public library and the Layton Art Gallery, the last a gift from one of Milwaukee's public-spirited citizens. The county courthouse and city hall are also fine buildings.

Milwaukee has an excellent public school system, with four large high schools, besides numerous private institutions, including Concordia College, Marquette College and the Milwaukee-Downer College for women. It is also the seat of a state normal school and has two medical colleges. The state industrial home for girls is located in the city, and a mile west of its limit is a national soldiers' home, in the midst of fine grounds covering about 400 acres.

Milwaukee's excellent harbor, which is now protected by a breakwater two miles long, has been instrumental in creating the extensive commerce which the city now enjoys, as an important collecting and distributing center for the northwest. Milwaukee receives its coal by way of the lakes from the east, and large quantities of iron ore are shipped in from the north. The manufacturing interests of the city are large in proportion to its population. The chief manufactures, in the order of their importance, are metal, clothing, leather and beer. In 1902 the value of the products was over \$230,000,000, and the total wholesale business was over \$325,000,000. The chief officer of the city is the mayor, who is chosen by the electors, as are the treasurer, controller, attorney and a common council, consisting of two aldermen from each ward. The business of the city is transacted by various boards, each of which, if consisting of more than four members, is required by law to represent two political parties.

HISTORY. In 1818 Solomon Juneau built a little log cabin on the east side of the Milwaukee River, and this is considered the first permanent settlement of Milwaukee, although trading posts had been established there before and Jesuit priests had located in the vicinity. A village of Pottawatomi indians was then in existence at this point. The region around Juneau's house was known as Juneautown. The west side of the river, which was settled by Byron Kilbourn in 1734, was called Kilbourn-town, and the region south of the Menominee River was called Walker's Point, for George H. Walker, who settled there in the same year. For a long time there was bitter rivalry among the three villages, but this gradually died out, and Juneautown was organized as the village of Milwaukee in 1837. Two years later Kilbourn-town was annexed, and in 1845 Walker's Point was joined, and the three settlements were incorporated as the city of Milwaukee. Solomon Juneau was chosen the first mayor.

POPULATION. The population of Milwaukee in 1905 was 312,948. It is a mixed population, in which for many years people of German birth largely predominated; in fact, for many years German customs were more in evidence than those of America. During the Civil War a company was formed composed wholly of German turners. More recently Poles, Dutch, Scandinavians, Bohemians and other peoples have colonized different parts of the town, and although certain words still remain solidly German, a majority of the inhabitants are of non-German descent.

Mim'icry, the name given to that condition or phenomenon which consists in certain plants and animals exhibiting a wonderful resemblance to certain other plants or animals, or to the natural objects in the midst of which they live. This peculiar characteristic is generally the chief means of protection of the animal against its enemies. It is well seen in the leaf insects and in the walking-stick insects. Certain tropical butterflies reproduce the appearance of leaves so closely that even the parasitic fungi which grow upon the leaves are imitated. Some caterpillars resemble the twigs of trees and when alarmed stand rigidly out from the branch to increase the likeness. A few flies, whose larvae are parasitic on bees, by closely resembling their host are able to enter the hives and deposit their eggs. A South American moth has a most accurate resemblance to a humming bird; while the cacti of America and the euphorbias of Africa might easily be mistaken for each other, though widely different in structural character. The theoretical explanation of this quality is attributed by recent biologists to purposes of self-preservation.

Min'aret, the tower of a mosque. A mosque has one or more minarets, often as many as four, one at each angle of the enclosure; one mosque, that at Mecca, has seven. The minaret is generally a slender, polygonal or cylindrical shaft of brick or stone. It has several stories, with projecting balconies from which the muezzin calls the people to prayer. It terminates in a tapering cone, crowned by a pinnacle or small dome, and is ascended by a narrow, spiral staircase. Many examples are found in the architecture of the thirteenth and sixteenth centuries in Egypt, Spain, Syria India and Turkey. See Mosque.

Min'as Bay or **Basin of Minas**, the name given to the eastern arm of the Bay of Fundy. It extends for 60 miles into Nova Scotia. The



1, Hornless Brazilian... resembling a wasp.
 2, 1 and 1, Butterfly-like... on leaf.
 3, South American leaf insect.
 4, Brazilian bug resembling bark.
 5, Harmless fly.
 6, Walking Stick.

PROTECTIVE MIMICRY—INSECTS

Milwaukee has an excellent public school system, with four high schools, besides numerous private institutions, including Convent College, Marquette College, and the Milwaukee-Wisconsin College for women. It is also the seat of a state normal school and has two medical colleges. The state industrial home for girls is located in the city, and a fine model of its kind is a national soldiers' home, in the midst of fine ground covering about 400 acres.

Milwaukee's excellent harbor, which is now protected by a breakwater two miles long, has been instrumental in creating the extensive commerce which the city now enjoys, as an important collecting and distributing center for the northwest. Milwaukee receives its coal by way of the lakes from the east, and large quantities of iron ore are shipped to Iron Range. The manufacturing business at this city is largely in paper, printing, and bookbinding, and, secondarily, in the manufacture of machinery, including engines and pumps. In 1902 the value of the products was over \$270,000,000, and the total wholesale business was over \$205,000,000. The chief officer of the city is the mayor, who is chosen by the citizens, as are the treasurer, controller, attorney and a common council, consisting of two aldermen from each ward. The business of the city is transacted by various boards, each of which, if consisting of more than four members, is required by law to represent two political parties.

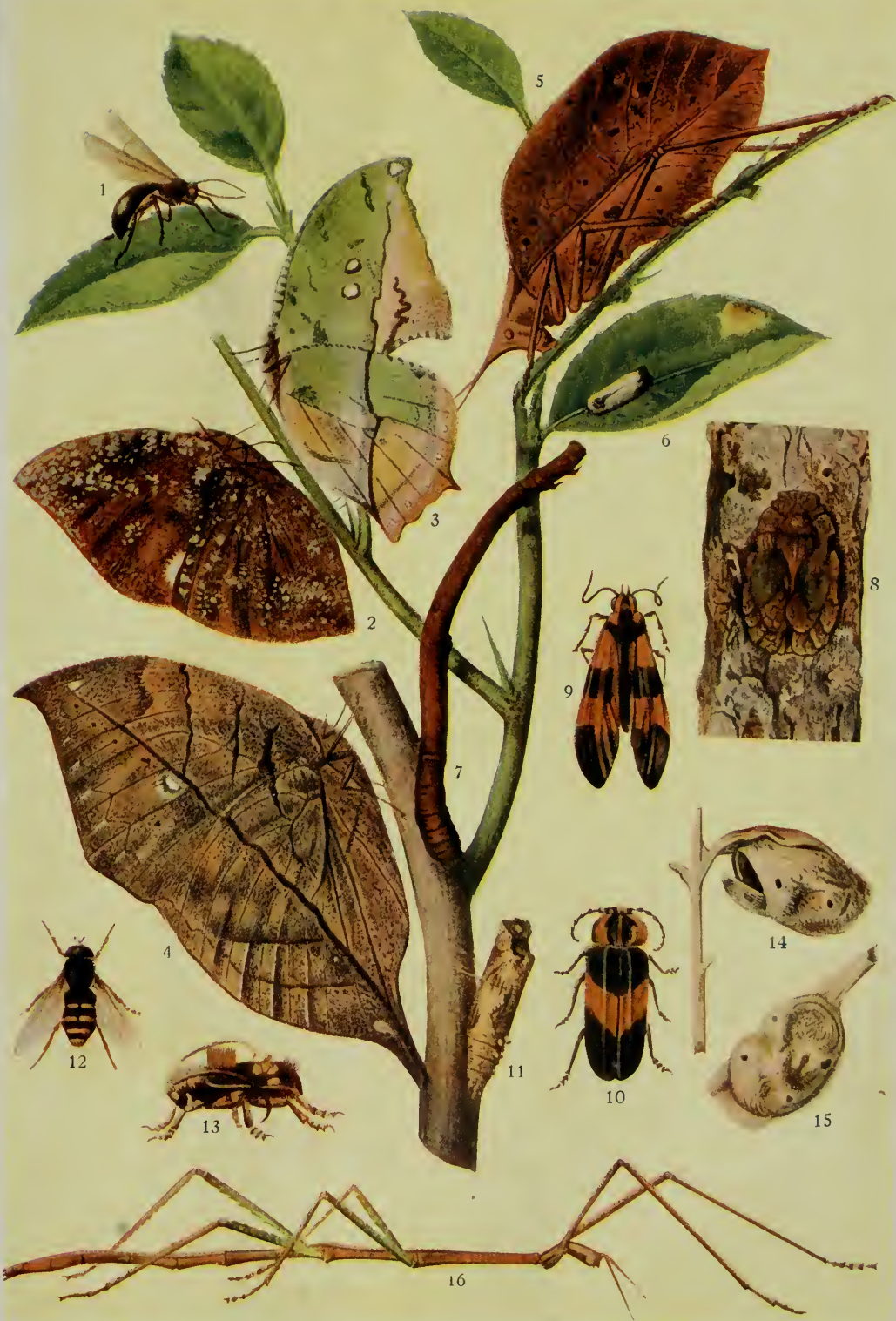
HISTORY. In 1818 Solomon Juneau built a little log cabin on the east side of the Milwaukee River, and this is considered the first permanent settlement at Milwaukee, although trading posts had been established there before and French posts had existed in the vicinity. A village of Potawatomi Indians was then in existence at the point. The region around Juneau's house was known as Juneautown. The west side of the river then was settled by Brian Kilbourn in 1827, and called Kilbourn-town, and the region south of the Menominee River was called Watkeys Point, for George H. Walker, who settled there in the same year. For a long time there was rivalry among the three villages, but in 1830 they joined, and Juneautown was incorporated as the village of Milwaukee in 1837. The same year Kilbourn-town was annexed, and in 1848 Walker's Point was joined, and the three villages were incorporated as the city of Milwaukee. Solomon Juneau was chosen the first mayor.

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MIMICRY, the name given to that condition or phenomenon which consists in certain plants and animals exhibiting a wonderful resemblance to other plants or animals, or to the natural objects in the midst of which they live. This quality is characteristic, generally, of the lower forms of the animal kingdom, and is especially marked in the leaf insects, the typical members of which bear a striking resemblance to leaves, twigs, and other objects of their environment. Some caterpillars resemble the twigs of trees and bend themselves rigidly out from the branch to increase the likeness. A few flies, whose larvae are parasitic on bees, by closely resembling their host are able to enter the hives and deposit their eggs. A South American moth has a most accurate resemblance to a humming bird; while the cacti of America and the euphorbias of Africa might easily be mistaken for each other, though widely different in structural character. The theoretical explanation of this quality is attributed by recent biologists to purposes of self-preservation.

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Minas Bay or Basin of Minas, the great bay on the coast of Rio de Janeiro, Brazil. It is bounded by the mountains of Nova South.



PROTECTIVE MIMICRY—INSECTS

- 1, Harmless Brazilian insect resembling a wasp.
2, 3 and 4, Butterflies resembling leaves.
5, South American leaf insect.

- 6, Moth resembling spot on leaf.
7, Measuring worm that when frightened resembles a dead twig.
8, Brazilian bug resembling bark.

- 9 and 10, A fly and an offensive beetle.
11, Cocoon resembling broken twig.
12, A harmless fly.

- 13, Beetle resembling caterpillar distasteful to birds.
14, Bee's Nest.
15, Cocoon.
16, Walking Stick.

tides in the basin are very strong and have been known to reach the height of 60 or 70 feet. The principal river which empties into the bay is called the Avon. The village of Grand Pré, celebrated in Longfellow's *Evangeline*, is situated on the Bay of Minas.

Mind, the sum of the powers of knowing, feeling and willing, the entire spiritual nature, or the soul. From Aristotle to modern philosophers, many theories as to what mind is, have been advanced, and their elaboration and discussion have presented some of the most difficult problems of metaphysics. The early theories consider the mind as separate from the body, but later theories recognize the intimate relation between mind and body. The study of physiological psychology has shown that mental action is based upon certain physiological conditions. Many psychologists use mind and soul as synonymous terms, while others consider mind the more comprehensive term and restrict the term *soul* to include those activities especially connected with the religious nature.

Mindanao, *meen da nah' o*. See PHILIPPINE ISLANDS.

Mindo'ro. See PHILIPPINE ISLANDS.

Mineralogy, *min ur al' o jy*, the science which treats of minerals. It includes the study of all inorganic substances in the earth and on its surface. As distinguished from geology, mineralogy deals with the various mineral bodies as separate substances forming the earth's crust and examines their properties as such, while geology treats them together as building up the crust of the earth. Mineralogy is closely related to chemistry, since without a knowledge of this branch of science, it would be impossible to determine the composition of minerals.

Minerals are classified according to their structure, their chemical composition and their physical conditions. In structure solid minerals are either *crystalline* or *massive*. When crystalline, they conform to some system of crystallization (See CRYSTALLOGRAPHY). The study of the crystals of minerals is very important, since each substance always crystallizes in the same form, and by learning the angles or number of sides of crystals, the composition of the mineral can very largely be determined. Another important test in the classification of minerals is *hardness*. In accordance with this quality, minerals are classified according to numbers, from 1 to 10. Beginning with the softest, they occur in the following order: 1, *talc*; 2, *selenite*; 3, *calcite*; 4, *fluorite*; 5, *apatite*;

6, *feldspar*; 7, *quartz*; 8, *topaz*; 9, *corundum*; 10, *diamond*. A mineral which ranks in hardness between any two successive numbers on the scale, as between 5 and 6, has its degree of hardness indicated by a fraction, as 5.5. The electrical condition of minerals is also considered in determining their classification. This can be found by subjecting them to the influence of an electric current. Consult E. S. Dana's *Minerals and How to Study Them* and J. D. Dana's *System of Mineralogy*.

Min'eral Oil. See PETROLEUM.

Mineral Waters, the term commonly, but somewhat erroneously, applied to the spring waters that contain an unusual quantity of such substances as sodium, magnesia, iron, carbonic acid and sulphur. It has not been found practical or useful to classify mineral waters under their chemical elements, but the attempt has been made, springs being described as salt, earthy, sulphur, iron, alkaline or alkaline-saline. Besides the substances which these terms indicate, the waters are frequently impregnated with carbonic acid gas.

Mineral Wool, a substance which is produced from the glassy liquid slag of the blast furnace, drawn out into fine fibers under pressure of steam. The slag, when in a molten condition, is driven by the steam from the furnace through a crescent-shaped aperture and suddenly cools into long, fibrous filaments. The thin, glassy, thread-like substance thus produced is useful as a non-conductor of heat, and it has, therefore, been largely employed as a covering for boilers and steam pipes and to protect water pipes from frost.

Minerva, *min ur' va*, (known by the Greeks as *Athene*), in classical mythology, the goddess of the intellectual powers, the daughter of Jupiter and Metis. According to popular legend, before her birth Jupiter swallowed her mother, and Minerva afterwards sprang from the head of Jupiter. Whatever other qualities she might possess, and these were many, she was always the symbol of the thinking faculty, the goddess of wisdom, science and art; but she was also a skilled warrior and the protector of warriors and is therefore usually represented completely armed, her head covered with a gilt helmet. At times, however, as the goddess of the peaceful arts, she appeared in the dress of a Grecian matron. Her distinctive symbols were the aegis and the gorgon's head, and the olive tree was sacred to her. Athens, which was named after her, was the city in Greece most sacred

to her, while at Rome, also, she had several temples.

Mining. In its broadest meaning, mining comprehends all the processes whereby the useful minerals are obtained from their natural localities beneath the surface of the earth, together with the subsequent operations by which many of them must be prepared for the purposes of the metallurgist. As the term is now generally used, it means the art of obtaining



MINERVA

the ores from the earth, while the processes connected with separating the metals from their ores are included under *metallurgy*. Mining has been practiced from the remotest times. It is referred to in the twenty-eighth chapter of the book of *Job*, and an Egyptian papyrus, drawn in 1400 B. C., preserved in the museum at Turin, illustrates the workings of a gold mine.

All mineral deposits are divided into two very broad divisions. The first includes the beds, or seams, of iron ore, coal and salt. These are deposits laid out more or less horizontally and parallel to the stratification of the surrounding rocks. The second class includes mineral

veins, or lodes. The mining appliances employed are very different in the two classes of deposits. In the first class, it is desirable to make a hole of the shortest possible depth from the surface of the ground to the bed of mineral. A shaft is therefore sunk through valueless beds until the mineral is reached. Machinery of the best class is then used to extract the whole of the mineral, due precautions being taken to avoid danger from falls of roof and from noxious gases. In the second class of deposits, the inclination of the mineral vein has to be taken into account, as the deposit varies considerably in inclination and in size. The vein must therefore be studied foot by foot, downward from the top. In some cases a vertical shaft is sunk, and passages, known as *cross-cuts*, or *levels*, are driven from this to the vein at different depths. A vertical shaft presents the advantages of greater ease in sinking, hauling and pumping. In the search for mineral deposits, the best evidence is obtained by putting down bore holes. These are made by various methods and are sent to a depth of a few feet, when required for testing the character of the foundation subsoil, or, in other cases, to thousands of feet, when required in seeking for or estimating the value of deposits of coal, salt and iron.

In order to open up a mine, tunnels, or entries, are driven into the lode or bed whenever the contour of the country admits of this scheme. Shaft sinking involves a larger outlay of capital and greater working cost. In the ordinary method of sinking shafts, the workmen, standing upon the bottom of the pit, blast out the rock and send the excavated material to the surface by means of an engine, rope and bucket. The sides of the shaft are supported by timbering or walling. By the use of steam power for operating the hoisting apparatus, shafts can be sunk to almost any depth desired. The deepest shaft in the world is at the Calumet and Hecla copper mine, Calumet, Mich. It exceeds 5000 feet. The cutting of a path through the harder rocks, as carried on by the ancient miners, was particularly laborious. Previous to the introduction of blasting, the implements used were of the nature of wedges and hammers. Bit by bit pieces of rock were broken away, the operation being aided by natural fissures in the rock and by the brittleness of the hard material. In this way the ancient miners cut coffin-shaped galleries 6 feet in height. At the present time the galleries, or levels, are usually $7\frac{1}{2}$ feet high and 5 feet wide, thus affording greater facility for

Mining

traveling and for ventilation. In the operation of blasting, use is made of a drill of steel. This may be struck with a hammer, but wherever possible rock drills driven by steam, compressed air or electricity are in use. The bore hole, when finished, is then charged. Gunpowder, compressed powder, dynamite and gun cotton are employed. Nitrated guncotton has also given admirable results. The fullest benefit of these modern explosives can be obtained only by the use of strong charges fired by electricity, by which it is possible to place a number of bore holes in such a manner that when fired together they shall help one another. For removing coal, these high explosives are too quick in their action, and blasting powder continues to be used.

COAL MINING. Coal is usually found in horizontal layers, except in the anthracite regions, where some veins are in an oblique position. Such veins are often mined by excavating a gallery into the side of the hill, but most coal mines are entered through a vertical shaft, which is sunk to the bottom of the first workable vein. This shaft is rectangular in shape, usually 30 feet long and 8 to 10 feet wide. It is divided into four sections, in two of which the hoisting cages operate. Of the others, one is generally used for ventilation and the other for conveying pipes for pumping and electric wires. This division also has a stairway or system of ladders, which may be used in case the hoisting machinery is injured. From the foot of this shaft a gallery is excavated in opposite directions. If the vein of coal is deep enough to admit of working without the removal of rock, little or no rock is disturbed; otherwise, enough rock has to be excavated to enable the miners and trams to pass through the gallery. From this main gallery, other galleries are excavated at frequent intervals, running at right angles to the main gallery, and from each of these are still smaller galleries, leading into the vein of coal. The roof of the mine may be supported in one of two ways—by leaving pillars of coal at frequent intervals, or by the use of timbers. In a mine free from obstructions, the arrangement of galleries resembles very closely that of the streets in a well-planned city.

Tramways are laid in the main gallery and those leading off from it. Upon these, cars are hauled by mules or, in very large mines, by electric power, to the foot of the shaft, whence they are run upon the hoisting cages and elevated to the surface, where they are unloaded

Mink

by dumping. In some of the coal measures, the shaft is sunk until it cuts a number of veins of coal, and in this case cars are hoisted from different levels; but in the bituminous fields it is not customary to work more than one vein at a time.

Because of the formation of gases (See **FIRE DAMP**), coal mines need to be more thoroughly ventilated than other mines. The ventilation is provided either by means of a fan at the foot of the shaft, to draw air from a fresh air shaft at another part of the mine, or by a fan on the surface, which forces the air in through a shaft constructed for that purpose. By the use of partitions the direction of the air current is controlled so that every part of the mine is ventilated. The portions newly opened are usually more dangerous than the others, for it is in these that the gases are liable to collect.

Min'isters, **FOREIGN**, those accredited representatives that one country sends to another. They are divided into three classes. The highest in rank is the *ambassador extraordinary*, who can claim to represent his state or sovereign in his own person, and who receives honors and enjoys privileges accordingly. The *legates* and *nuncios* of the pope also belong to this class. *Envoys extraordinary*, *internuncios* and *ministers plenipotentiary* belong to the second class, and they do not hold the same degree of power nor receive the same distinction as the former. The third class includes *ministers resident*, *envoys* and *charges d'affaires*. Persons who are sent merely to conduct the private affairs of their monarch or his subjects in a foreign place are called *agents* or *residents*; when occupied chiefly with matters of a commercial character, they are called *consuls*.

Min'istry, the name sometimes given to the heads of the executive departments of a government, taken collectively. It is usually synonymous with the term *cabinet*, though in some countries, as in Great Britain, the ministry includes, besides the cabinet, many under-secretaries of departments, who have seats in Parliament. See **CABINET**.

Mink, a mammal of the weasel family, allied to the polecat. It burrows on the banks of rivers and ponds and lives on frogs, crayfishes and fishes, which it pursues in the water. It emits a strong and disagreeable odor; its fur is in considerable demand. The American mink, found especially in the north, is about a foot and a half long, has small ears and eyes and is covered with a coat of rich brown fur.

The European species is smaller than the American and has beautiful brown fur which is more valuable.

Minneapolis, the FLOUR CITY, the county-seat of Hennepin co., Minn., is situated on the Mississippi River, 420 mi. n. w. of Chicago and 581 mi. n. of Saint Louis, upon the Great Northern, the Northern Pacific, the Chicago, Burlington & Quincy, the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul, the Chicago Great Western, the Saint Paul & Duluth and several other railroads. Minneapolis covers an area of a little over 53 square miles, extending on both banks of the Mississippi for nearly 10 miles and having an extreme east and west extent of about 6 miles. On the south it borders upon Saint Paul. The river divides the city into two unequal divisions, known as the East Division and the West Division. Below the Falls of Saint Anthony, which are in the heart of the city, the Mississippi flows through a deep gorge, and within the city limits the river is spanned by eighteen bridges. The city is built upon nearly level ground and is regularly laid out, most of the streets running at right angles. Both the East and West divisions are divided into north and south sections. The West Division, which is by far the larger, is divided by Hennepin Avenue, and the East Division, by Central Avenue and Division Street. The streets from these dividing lines are numbered in their order, and those running parallel with the river are also numbered. The east and west streets are styled *avenues*, while the north and south thoroughfares are named *streets*. Hennepin Avenue, Nicollet Avenue and First and Second avenues, South, are the chief business streets for retail purposes. The wholesale and manufacturing districts are located on both banks of the river and extend as far as the city limits.

Minneapolis has an attractive system of parks and boulevards, which begins with Loring Park, in the center of the city, and includes the lake parks to the southwest, in which are situated lakes Calhoun and Harriet, both beautiful sheets of water. Lake Harriet is surrounded by a boulevard, which continues to the south and east until it reaches the Mississippi and thence southward along the bluffs of the river to Minnehaha Park, in which are located Minnehaha Falls. On the river bluffs is also Riverside Park, which is about a mile below the Falls of Saint Anthony. The city, in connection with Saint Paul, has one of the finest systems of street

railways in the country, the system covering both cities under one management.

The city is well built and contains a number of public buildings and business blocks which equal in their architectural features and construction those found in any other city in America. Foremost among these is the county courthouse and city hall, erected by the county and city at a cost of about \$3,500,000. This structure occupies an entire block. It is built of Ortonville granite and is finished in marble. It has a tower 350 feet high, in the upper story of which is an observatory, from which an excellent view of the city can be obtained. Among other buildings worthy of mention are the Auditorium, with a seating capacity of over 2000; the Masonic Temple; the Lumber Exchange; the public library, containing 150,000 volumes and an art gallery and museum; the Metropolitan Life Building; the New York Life Building; the Chamber of Commerce, and the West Hotel. The city is also noted for its large and beautiful churches. The most important among these are the Church of the Immaculate Conception, Wesley Methodist, Plymouth Congregationalist, Park Avenue Congregationalist, Westminster Presbyterian, First Unitarian and the Church of the Redeemer, Universalist. To these should be added the buildings of the University of Minnesota (See MINNESOTA, UNIVERSITY OF).

Minneapolis is an important manufacturing and commercial center. It has long been known as the largest center of the manufacture of flour in the world, and its combined mills now have a capacity of nearly 85,000 barrels in twenty-four hours. These mills are situated on both banks of the Mississippi, at the head of the Falls of Saint Anthony. Next in importance to the manufacture of flour is the manufacture of lumber, in which also Minneapolis has been the leader of the world. In the banner year (1899), the output of her mills exceeded 594,000,000 feet, but with the decrease of supply this amount has diminished until now the annual output is about 400,000,000 feet. Most of the timber is obtained from the regions to the north. Other industries of importance are the manufacture of lumber and timber products, such as furniture, boxes and the like; cooperage, for which the manufacture of flour creates a large demand; the manufacture of underwear and other knit goods, fur goods, foundry and machine shop products and malt liquors, the manufacture and repair of railway cars and the manufacture of small wares.

As a primary wheat market Minneapolis is the most important in the country. Besides the lumber manufactured in the city, Minneapolis is also an exchange point for large quantities of lumber manufactured in other places and forwarded for sale. The city also contains excellent wholesale and retail stores, connected with nearly all lines of mercantile business.

Minneapolis was settled in 1854. The great water power furnished by the Falls of Saint Anthony soon made it an important manufacturing center. It was incorporated as a town in 1856 and became a city in 1867. Population in 1905, 261,974.

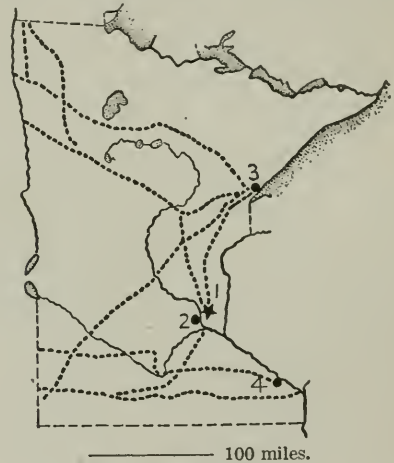
Min'nesing'ers, the name given generally to the German nobles and princes of the twelfth and thirteenth centuries who went about from court to court, composing and singing poems. As was natural, considering the time they flourished, most of their compositions dealt with the customs and achievements of chivalry. See **MASTERSINGERS**.

Minneso'ta, the **GOPHER STATE**, situated in the north central part of the United States and in the geographical center of North America, half-way between the line of perpetual frost on the north and the line of no frost on the south. It is bounded on the n. by Manitoba and Ontario, on the e. by Lake Superior and Wisconsin, on the s. by Iowa and on the w. by the Dakotas. The eastern portion of the northern boundary consists of a chain of lakes and rivers, of which the Rainy River and Lake of the Woods are the most important. The eastern boundary is formed almost entirely by Lake Superior and the Saint Croix and Mississippi rivers, and a large portion of the western boundary is formed by the Red River of the North. The greatest length from north to south is about 400 miles, from east to west, 380 miles, and its average width is 240 miles. The area is 83,365 square miles, of which 4160 square miles are water, not including Lake Superior. Population in 1905, 1,979,912.

SURFACE AND DRAINAGE. Notwithstanding its large area, Minnesota contains no lofty mountains nor deep valleys. A height of land with an elevation of about 1700 feet extends in an irregular line approximately east and west through the north central portion of the state. From its slopes, rivers flow in all directions. The highest land is in the Mesaba range, in the northeastern section, where the loftiest summits are about 2200 feet. The region around Lake Superior is the lowest, having an altitude of

about 600 feet. From this low land southward and westward to the valley of the Red River of the North, the surface consists largely of rolling land, interspersed with streams and lakes and covered with pine or hard wood forests. Along the Mississippi are high bluffs, which in the southeastern portion of the state reach an altitude of nearly 1800 feet. The southern tiers of counties are largely rolling prairies, which merge into the high parallel swells in the southwest, sometimes known as *coteaus*, and designated by Longfellow in his *Hiawatha* as "mountains of the prairie." The valley of the Red River of the North, which includes the northwestern counties, is level.

The drainage includes three river systems. A small section of the northeastern corner of



MINNESOTA

1, Saint Paul; 2, Minneapolis; 3, Duluth; 4, Winona. Dotted lines indicate chief railroads.

the state drains through the Saint Louis and a number of short rivers into Lake Superior. North of the height of land the rivers flow into the Rainy River and the chain of lakes which connect with the Hudson Bay system. The central and southern portions of the state, including more than one-half of its area, are drained into the Mississippi. The most important tributary of this stream within the state is the Minnesota, which flows in a southeasterly, then northeasterly direction entirely across the state. The northwestern section is drained into the Red River of the North, whose tributaries are few, only one, the Red Lake River, being of any importance.

Minnesota contains over 6000 lakes. The largest one that lies wholly within the state is

Red Lake. Of the Lake of the Woods, on the northern boundary, only a small portion belongs to Minnesota. What is known as the lake region extends southward through the central part of the state and contains thousands of small lakes surrounded by timber, noted for the beauty of their scenery, the clearness of their water and the abundance of fish. Many of these are popular summer resorts. On the western boundary are lakes Traverse and Big Stone, the former the source of the Bois de Sioux, and the latter the source of the Minnesota.

CLIMATE. The climate of Minnesota is cool temperate. The summers are characterized by many hot days, followed by cool nights. The thermometer rises to 90°, or even 100°, during July and August. The autumns are remarkably mild and pleasant, frosts seldom occurring before the middle of October. The winters are characterized by clear, cold weather, in which the temperature sometimes falls as low as 40° below zero. The springs are short, the transition from winter to summer being quite rapid. The atmosphere is dry and clear, and the extremes of temperature are therefore not noticed as much as they are in regions of less variation but of greater humidity. The rainfall for the entire state is about 24 inches. It is heaviest in the eastern half and lightest along the western border, but everywhere it is sufficient for agricultural purposes and is evenly distributed throughout the year.

MINERAL RESOURCES. Minnesota is the leading state in the Union in the production of iron ore and contains what are probably the largest iron mines in the world. These are located in the Mesaba and Vermilion ranges, near the head of Lake Superior (See IRON). The ore is shipped by rail to Duluth and Two Harbors, and thence it goes by boat to the various points on the Great Lakes, where it is smelted. There are valuable granite quarries at Saint Cloud and Ortonville, on Big Stone Lake. A pink limestone of great value as a building stone is found in Blue Earth and Lesueur counties, in the southern part of the state; a cream-colored limestone is quarried at Red Wing, and a dolomite rock is found near Rochester. A brown sandstone is also found near Sandstone, and in Pipestone County, in the southwestern part of the state, are extensive quarries of red jasper, especially valuable for building and ornamental purposes. At the foot of this quarry is also found the famous deposit of pipestone used for so many centuries

by the Indians in making peace pipes. So far as known, this is the only important deposit of this rock in the country. Slate occurs in the northern part of the state, and brick clay is quite generally distributed.

AGRICULTURE. Minnesota is one of the leading agricultural states and produces large quantities of the best quality of spring wheat, the entire valley of the Red River of the North being especially suited to the production of this grain. Wheat is also grown on much of the tillable land in other parts of the state, so that the entire output is large. Other crops of importance are oats, corn, barley, rye and potatoes. Hay is raised in large quantities, and dairying and the raising of live stock are important branches of agricultural industry. In the southern part of the state the more hardy varieties of apples, strawberries and other small fruits are grown successfully, though fruit growing is not an important agricultural industry. On the new lands extensive crops of flax are raised for the seed, which is used in the manufacture of linseed oil. The fiber to some extent is shipped to manufacturers.

MANUFACTURES. Minnesota has an abundance of water power, and the presence of extensive forests and excellent shipping facilities have combined to develop her manufactures more rapidly than these industries have been developed in other states as far west. Saint Paul, Minneapolis and Stillwater are the leading manufacturing centers. The most important of the industries is the manufacture of flour and grist mill products, in which Minneapolis leads the world. Next in importance is lumber. There are over 50,000 square miles of forest land in the state. The northern part of the state contains the largest forests of white pine found within the Union, and south of these are forests of hard wood, while in various localities are found Norway pine and spruce. The great lumber centers are Minneapolis, Stillwater, Brainerd and Little Falls, where logs are not only manufactured into lumber, but made into furniture, finishings for interiors and other articles of wood.

TRANSPORTATION AND COMMERCE. The state has the advantage of two important water routes, the Mississippi and the Great Lakes. The multiplication of railways has rendered the Mississippi of less importance than formerly, but the importance of the lake route grows with the development of the country. Duluth, at the head of Lake Superior, has now become one

of the important shipping points of the country. The Northern Pacific and Great Northern railways have lines extending across the northern and central parts of the state from east to west, also lines from Saint Paul and Minneapolis to the northwest, connecting with the trunk lines. The Chicago, Milwaukee & Saint Paul road has a line extending across the southern part of the state, while the Northwestern maintains a line approximately parallel to this and somewhat north of it. These, with the numerous cross lines, now give the state ample railway facilities, with the exception of the northern counties, which are still sparsely settled. Saint Paul is the great railway center, not only of Minnesota but of the northern part of the Mississippi valley.

The commerce of the state is extensive. This is due to the production of large quantities of grain, lumber and iron ore, which are exported, and to the shipping facilities in Duluth, which cause many of the commodities to and from the territory west of the Mississippi to pass across the state. The imports consist of coal and manufactured goods and some food products.

GOVERNMENT. The legislature consists of a senate of 63 members, elected for four years, and a house of representatives of 119 members, elected for two years. The sessions are biennial and are restricted to ninety days. The executive department of the government consists of a governor, a lieutenant governor, a secretary of state, a treasurer and an attorney-general, elected for two years, and an auditor, elected for four years. The judiciary department consists of a supreme court of five judges, elected by the voters of the state, and of district courts, presided over by judges elected for six years. Each county maintains a probate court, and townships have justices of the peace.

EDUCATION. The system of public schools is based upon the district plan, but is unified much more thoroughly than in most other states. At the head of the system is the University of Minnesota, at Minneapolis, which has organic connection with all of the high schools and through a system of examinations provides for the admission of graduates of these schools to the university. There is also an organic connection between the high schools and the graded schools and the ungraded schools of the rural communities. The state superintendent of public instruction is at the head of the educational system, and the schools of each county are under the supervision of a county

superintendent. The school fund derived from the sale of school lands is very large and is constantly growing. In addition to the aid received from this fund, each high school maintaining a course of study which prepares for admission to the university receives from the state an annual appropriation of \$1000. Graded schools and country schools under certain conditions also receive direct state aid. In connection with the school system is a system of public libraries, which provides libraries for all school districts that are willing to assume a portion of the expense. A thorough system of traveling libraries is also maintained. There are state normal schools at Winona, Mankato, Saint Cloud, Moorhead and Duluth. Other important institutions of learning, maintained by various denominations, are Carlton College at Northfield, Hamlin University at Hamlin, Macalester College at Saint Paul, Gustavus Adolphus College at Saint Peter and the Shattuck School at Faribault. There are also a number of large parochial schools and colleges in the state, under the management of the Roman Catholic Church.

INSTITUTIONS. The hospitals for the insane are at Rochester, Saint Peter and Fergus Falls; the schools for the deaf, the blind and the feeble-minded are at Faribault, and the State Public School for dependent children is at Owatonna. The penal institutions consist of the penitentiary at Stillwater, the reformatory at Saint Cloud and a state training school at Red Wing.

CITIES. The chief cities are Saint Paul, the capital; Minneapolis, Duluth, Winona, Stillwater and Mankato, each of which is described under its title.

HISTORY. The territory of Minnesota was first visited in 1678 by a Frenchman, Duluth, who built a fort at the site of the city which now bears his name. Hennepin discovered the Falls of Saint Anthony two years later, and within two decades settlement had begun in earnest. The region was ceded to Great Britain in 1763, was ceded to Spain in 1783, was retroceded to France in 1800 and was obtained by the United States through the Louisiana Purchase in 1803. The first permanent American settlement was a military post, Fort Snelling, established in 1819, but immigration and occupation practically began only after the treaty with the Dakotas in 1837, by which all of the indian lands east of the Mississippi were ceded. In 1849 Minnesota became a territory, and it was admitted into the Union in 1858. The development of the state was retarded by Sioux depredations,

which culminated in a great massacre in 1862. When these conditions passed and a system of railways opened up the state, rapid growth was possible. The most important issue after the Civil War was the question of redeeming or repudiating bonds which had been issued to promote railway construction. A compromise was reached in 1881. The state has been almost steadily Republican in politics. Consult Folwell's *Minnesota*, in the American Commonwealths Series.

Minnesota, UNIVERSITY OF, a state university, located at Minneapolis and established by an act of the territorial legislature in 1851. It was not opened for instruction, however, until 1869. The present organization includes the college of liberal arts, embracing science and literature; the college of engineering and mechanic arts, the college of agriculture, the college of law, the college of medicine and surgery, the college of homeopathic medicine and surgery, the college of dentistry, the college of pharmacy, the school of mines, the school of chemistry, the school of agriculture and a graduate department. The management of the university is vested in a board of trustees, of which the governor, the superintendent of public instruction and the president of the University are members *ex officio*. There are nearly 300 professors and instructors on the faculty, and the enrollment is about 4000. The institution is co-educational, and over one-third of its students are women. The university is at the head of the public school system and maintains a thorough supervision over the high schools of the state by a system of inspection and examinations. Graduates of all accredited high schools are admitted to the undergraduate departments without examination.

Minnesota River, a river in the United States which rises in Big Stone Lake, flows through Minnesota and falls into the Mississippi about seven miles above Saint Paul. Its length is about 475 miles, and it is navigable for small steamboats for about fifty miles.

Min'newit, PETER. See MINUIT, PETER.

Min'now, a popular name for any small fish. The roach, the golden shiner, the killifish and the mummichog are some of the fishes generally called minnows. They are the natural food of many larger fish and are generally used as bait for them.

Min'or. See INFANT.

Minor'ca, an island in the Mediterranean Sea, the second largest of the Balearic group. It

belongs to Spain. Its area is 293 square miles. The coast is irregular and for the most part steep and cliffy. The soil is not generally fertile, though considerable quantities of wheat, oil, wine, hemp, flax, oranges and lemons are produced. Iron, copper, lead and marble are plentiful. Population, 38,258.

Minor Prophets, THE, so called from the brevity of their writings, are twelve in number, namely, Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah and Malachi. Their prophecies are found in the Hebrew canon.

Min'os, in Greek legend, a king of Crete, the son of Zeus and Europa. According to one version of the legend he was a wise ruler who, after his death, was made a judge in the lower world. Other versions give less favorable accounts of his character and tell of his demanding from Athens young men and girls to be fed to the frightful Minotaur. See MINOTAUR.

Min'otaur, in Greek mythology, a monster with the body of a man and the head of a bull, which fed on human flesh. Minos, king of Crete, kept this monster shut up in a vast labyrinth and fed him on youths and maidens who were sent each year from Athens as a tribute. Theseus killed the minotaur and freed Athens from the terrible curse. See THESEUS.

Minsk, a town of Russia, capital of the government of the same name, on the Svislotch, 430 mi. s. w. of Saint Petersburg. It is the seat of a Greek archbishop and of a Roman Catholic bishop, and contains two castles. It has some manufactures, among which are leather, tobacco and agricultural implements, and it enjoys a considerable general trade. Population in 1897, 91,494.

Min'strel, the name applied to a class of poet musicians who flourished at different times in the Middle Ages and afterward. The first minstrels were men who wandered from place to place exhibiting their talent in poetry and music by composing and reciting verses commemorating heroes and heroic deeds. These verses were often set to simple music and sung to the accompaniment of the harp. The name is now given to a class of players who combine music, comedy, juggling and pantomime and other simple forms of entertainment.

Mint, the building and equipment used in the making of coins. The first mint was established in England and was managed by a local officer called the reeve, corresponding to the sheriff in the American county. In later times

not only the king, but nobles and bishops, coined money. More recently, however, the privilege of coining has been conceded to the sovereigns, and in all modern states they enjoy the exclusive right to issue money.

The first United States mint was established at Philadelphia, in 1792. The first coin, the copper cent, was issued in 1793. There are now five mints, located at Philadelphia, San Francisco, New Orleans, Denver and Carson City, but there are numerous assay offices at various points where silver and gold are mined. All the mints and assay offices are under the supervision of the director of the mint, who is appointed by the president and is responsible to the secretary of the treasury. For a description of the processes in the coining of money, see article COINING; for a discussion of the economic nature of money and for a statement of the different coins now in use, see article MONEY.

Mint, the common name of a large and important family of plants that is widely distributed throughout the temperate regions. See LABIATAE.

Min'uit or **Minnewit**, PETER (1580-1641), a governor of the New Netherlands under the Dutch West India Company (1625-1631). He purchased Manhattan Island and built Fort Amsterdam on the present site of New York City. He later laid the foundations of Fort Christopher (Wilmington) in Delaware, under the auspices of the South Company of Sweden.

Minute, *min'it*, a division of time and of angular measure. As a division of time it is the sixtieth part of an hour. As a division of angular measure it is the sixtieth part of a degree.

Minutemen, the name given in American history to those volunteer soldiers in the New England colonies who, though continuing in civil and professional pursuits, promised to take up arms at a minute's notice in defense of colonial rights. They took part in the first engagement of the war, at Lexington.

Miocene, *mi'o seen*, **Epoch**, a division of geologic time, including the middle portions of the Tertiary Period and extending from the Oligocene to the Pliocene epochs. In the United States the formations of this epoch are gravel, sand, volcanic tuffs and ashes. It was during this epoch that Central America and the Isthmus of Panama were raised above the sea. This term is discarded by the United States Geological Survey. See TERTIARY PERIOD.

Miquelon, *meek' lohN'*, an island in the Atlantic Ocean near the southern coast of New-

foundland. It has belonged to France since 1763. See SAINT PIERRE.

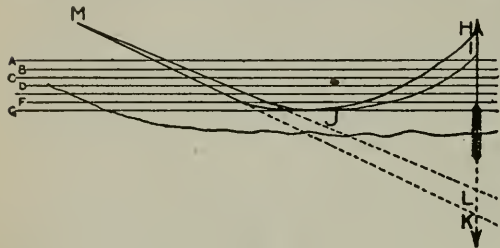
Mirabeau, *me ra bo'*, GABRIEL HONORÉ RIQUETTI, Count de (1749-1791), a French statesman and revolutionary leader. At an early age he manifested extraordinary intelligence, but his youth was a stormy and licentious one. He lived for some time in Holland and England, returning to France in 1785. On the assembling of the States-General in 1789, Mirabeau, elected for Aix, soon became prominent. When the king required the third estate to vote apart from the other two orders, it was Mirabeau who counseled resistance, demanded the withdrawal of the troops, consolidated the National Assembly and defied the king's orders. As a practical statesman, Mirabeau desired action, and for this reason he attempted to form alliances with Lafayette, the duke of Orleans, Necker and, finally, with the queen. Whether he might ultimately have been able to guide the revolution into peaceful ways has always been a matter of conjecture with historians, but it is certain that he was the only man who might possibly have done it.

Mir'acle (a wonder, a prodigy), a suspension of, or deviation from, the known laws of nature, brought about by the direct interference of a Supreme Being. It is in its nature, as the term implies, an occurrence which is strange, marvelous, inexplicable, and it is usually connected with some remote moral purpose. By the elder theologians a miracle was conceived to be the triumph of the Divine Will over the work of his hands and the laws of his making. In modern doctrine, however, the miraculous element is not considered to give evidence of opposing forces. On the contrary, a miracle is explained as a manifestation of the Divine Power working through laws and by methods unknown to us, which, upon a higher plane, are altogether natural and orderly.

Miracle Plays, a sort of dramatic entertainment common in the Middle Ages, in which the subjects were taken from the lives of saints and the miracles they wrought. They were originally performed in church, but latterly outside, in market places and elsewhere. In England they were first produced in the twelfth century. They differed from the mysteries mainly in subject.

Mirage, *me rahzh'*, the appearance of an object in the sky, due to the reflection of rays of light by a layer of atmosphere of different density from that in which the object is situated

(See LIGHT, subhead *Reflection of Light*). A mirage is an optical illusion and is usually seen on deserts, where the intense heat of the land causes the layers of atmosphere near the ground to be much rarer than those above. In the figure, the rays *ABCDEFGH*, striking the object *H*, are refracted downward, and they are not reflected back until they strike the surface of the layer *J*. This acts like a mirror and reflects the rays to *I*. The observer at *M* sees the object at *L* and *K*; consequently, it appears inverted, as though it were reflected in a pool or lake. This illusion is very deceptive and often



leads travelers to think that they are near bodies of water when no water is present. Sometimes objects are seen inverted in the sky without any apparent cause. This is because some intervening object occurs between the observer and the object which produces the image. The most perfect mirage is produced when the sun is near the horizon, just at sunrise or sunset, since at those times the sun's rays are nearly horizontal and the refraction and reflection are nearly perfect. It is because of this that people living in valleys can often see the summits of mountains at morning or evening which are invisible during the remainder of the day.

Miramichi, *mir a me she'*, a river of New Brunswick, Canada. It rises in two branches, flows in a general easterly direction for about 220 miles and empties into Miramichi Bay. Its length is about 220 miles, but it is navigable for only about 45 miles.

Mirror, a smooth surface capable of reflecting regularly a great proportion of the rays of light that fall upon it. In the ordinary sense, a mirror is a pane of glass coated on the back with an amalgam of mercury and tin. The mirrors used by the ancients were made of thin polished bronze, either set in a case or fitted with a handle. At a later period they used mirrors made of obsidian, a stone closely resembling black glass and capable of taking a high polish.

A *plane mirror* is one having a flat surface.

Plane mirrors are those in common use in homes and public buildings. The image seen in a plane mirror is of the same size as the object and appears as far behind the mirror as the object is in front of it, but with the sides reversed. The right hand of your image when seen in a mirror is where your left hand would be were you facing in the same direction. The image seen by one observer is not that seen by another. In Fig. 1 let *MN* represent the mirror and *E* and *F* represent two observers. *AB* is the object and *A'B'* the image. The observer at *E* can see the image in the direction of the rays *EA'* and *EB'*, while the observer at *F* would see the image in the direction of *FA'* and *FB'*.

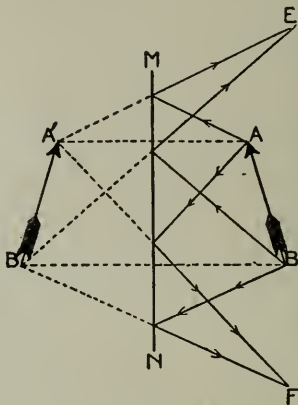


FIG. 1

A *concave mirror*, like a lamp reflector, is a section of the inside of a hollow sphere. When parallel rays of light strike a concave mirror, they are reflected to a common point, called the *focus*. The focus is in front of the mirror and directly opposite its center. Concave mirrors show two kinds of images. When the object is farther away from the mirror than the point which would form the center of the sphere of which the mirror is a

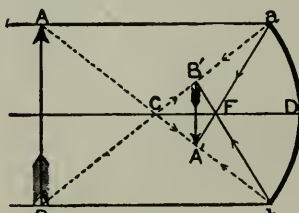


FIG. 2

part, the image formed is inverted and smaller than the object. It appears on a screen in front of the mirror, as shown in Fig. 2. The rays of light from the object, *AB*,

are reflected to *a* and *b*, while the rays *Ab* and *Ba*, which strike the mirror perpendicularly, are reflected back upon themselves. The rays *Aa* and *Bb* are reflected respectively at *aA'* and *bB'*. These reflected rays cross each other at *F*. The rays *Ab* and *Ba* cross at *C*. If the screen is placed at the point where these two sets of rays meet, it receives the image *A'B'*. If the screen is moved either toward

the mirror or away from it, some of the reflected rays are lost and the image becomes indistinct. When the object is nearer the mirror than the center of the sphere of which the mirror forms a part, the image appears back of the mirror and is erect and magnified. This effect can easily be produced by using a common lamp reflector and holding the finger or some other object in front of it.

A *convex* mirror is formed from the section of the outside of a sphere. The image formed by such a mirror is always seen back of the mirror and is erect and smaller than the object. Most hand mirrors are slightly convex. We notice that the image in such a mirror is distinct and considerably smaller than the object. See LIGHT, subhead *Reflection of Light*.

Mishawaka, *mish a waw'ka*, IND., a town in Saint Joseph co., 4 mi. e. of South Bend, on the Saint Joseph River, and on the Grand Trunk and the Lake Shore & Michigan Southern railroads. The various manufactures include windmills, machinery, agricultural implements, furniture, organs and other articles. It is one of the oldest towns in the state, having been settled in 1828. It was known as "Saint Joseph Iron Works" until the present name was given ten years later. Population in 1900, 5560.

Mis'sal, the book of the Roman Catholic Church containing the complete service for mass throughout the year. Pope Pius V in 1520 revised the missal, and its use was required in all churches which could not show that their own service-book had been in uninterrupted use for two hundred years. Clement VIII in 1604 and Urban in 1634 revised the missal, the latter revision being still in use.

Missionary, *mish'un a ry*, **Ridge**, BATTLE OF. See CHATTANOOGA, BATTLES OF.

Missions and Missionaries. Missionaries are men who devote their lives to the enlightenment and conversion of peoples, in the interest or under the auspices of some religion or religious organization. The first great Christian missionary was Saint John the Baptist, who preached the coming of Christ. Jesus commissioned his apostles to preach the gospel to all nations. They and their successors obeyed implicitly, and the result was the marvelous spread of the great religion, which soon had found its way over all parts of Europe.

A new impulse was given to missions by the discovery of the New World. Almost every merchant ship that sailed for the West Indies, Mexico, Peru and Brazil was accompanied by

zealous missionaries, eager to spread the Christian religion in the new lands. The powerful order of Jesuits turned their attention to the East, and the celebrated Francisco Xavier, a member of the order, met with remarkable success in India (See JESUITS). Thence Christianity was introduced into Japan, from which, however, it was forced to retire, because of the terrible persecutions waged against its missionaries. Father Ricci, another Jesuit, succeeded by the end of the sixteenth century in establishing a foothold in Peking. Roman Catholic missions since the early part of the seventeenth century have been thoroughly organized and have spent enormous sums of money in carrying their religion into all parts of the world. The Catholics of the United States have, since 1884, helped materially in supporting the missions for indians and negroes, besides contributing generously to the foreign fund. The most active missionary body is the Society of Jesus, or the Jesuits. It is estimated that there are now more than 60,000 Catholic workers, and that there is scarcely any part of the world unvisited by them.

The earliest Protestant foreign mission appears to have been one which was established by the French in Brazil in 1555. Shortly after the settlement of New England in 1620, John Eliot took a deep interest in the North American indians, and in 1646 he began a regular mission among them. It was not, however, until the eighteenth century that the true missionary spirit became general. The English took the lead and were speedily followed by the Danes and, especially, the Moravian Germans. The missionary idea spread among the various Protestant denominations, and all of them now have societies which contribute workers and money annually. The total number of societies engaged in these missionary enterprises is over 550, and they are represented in the field by about 18,000 missionaries and 79,000 native helpers. In modern times the missionaries have not confined themselves solely to the teaching of their religion, but have paved the way for it by the establishment of schools, the medical treatment of the sick and suffering natives and by teaching right methods of living.

Mississipp'i, the BAYOU STATE, one of the Gulf states, is bounded on the n. by Tennessee, on the e. by Alabama, on the s. by the Gulf of Mexico and Louisiana and on the w. by Louisiana and Arkansas, from which it is separated by the Mississippi River. Its extreme length from

north to south is 330 miles, and its extreme width is 188 miles. The average width is about 150 miles, and the area is 46,810 square miles, of which 470 square miles are water. Population in 1900, 1,551,270, of which 907,630 were colored.

SURFACE AND DRAINAGE. The highest land is in the northwest corner of the state, where the highest altitudes reach about 1000 feet. A low watershed, extending north and south, divides the state into two river basins—the eastern, which is drained into the Gulf of Mexico, and the western, which is drained into the Mississippi. This ridge is of rolling land broken into valleys, through which streams flow. To the west of it the land slopes into the bottom lands of the Yazoo and the Mississippi. These lands are low and level. To the east of the ridge the surface consists of rolling prairie. Over 7000 square miles of the surface consist of bottom lands which are so low that most of them have been reclaimed by the construction of levees.

The principal streams watering the eastern part of the state are the Tombigbee, the Pearl and the Pascagoula, all flowing directly into the Gulf. The chief tributaries of the Mississippi are the Yazoo, the Big Black, the Tallahatchie, the Sunflower and the Homochitto. There are no lakes except those directly connected with the rivers.

CLIMATE. Mississippi has a semi-tropical climate. The summers are long, but the intense heat which would otherwise prevail is tempered by breezes from the Gulf, and the thermometer seldom reaches 100°, while the mean for the summer is about 81°. The winters are short and mild, the mean temperature being about 45°. The northern part of the state is much cooler in winter than the southern. In the north, ice usually forms and snow is not uncommon. The average rainfall is about 50 inches for the entire state, but it is much greater in the southern than in the northern part. The heaviest

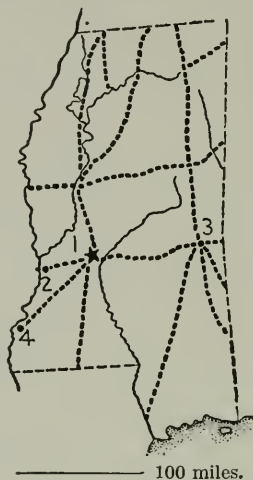
rains occur in late winter or early spring and are caused by the meeting of the warm winds from the gulf and the cold winds from the north.

MINERAL RESOURCES. The mineral resources are not abundant. Coal and limestone suitable for making hydraulic cement occur in the north-eastern counties, gypsum is found in the central part of the state, and clays and phosphate rock are quite generally distributed, though they are used only for local purposes. The state contains a large number of mineral springs, some of which have become somewhat famous as resorts. Among these are Iuka Springs, in the north-eastern county, and Ocean Springs, in the south-eastern part of the state.

AGRICULTURE. Agriculture is the leading industry. The soil is highly fertile, and the climate is remarkably well suited to the production of all crops adapted to a semi-tropical and warm temperate climate. The bottom lands are especially fertile and suitable for the raising of sugar cane in the southern part of the state and the growing of cotton in other regions. Cotton is the chief crop and occupies fully one-half of the acreage planted. In the production of cotton Mississippi is the third state in the Union. Among the cereals, corn and oats are the most important. Wheat, potatoes, hay and peas are also raised in large quantities, and in the southern part of the state attention is given to the raising of oranges, figs and other fruits which grow in a semi-tropical climate. Some rice is produced on the bottom lands, but it has not yet become an important crop.

MANUFACTURES. Mississippi is not primarily a manufacturing state, yet since 1890 the manufacturing industries have developed rapidly. The most important of these is the manufacture of lumber and timber products. Over 32,000 square miles of the state are covered with forests. In the southern section the yellow pine prevails, while in the central and northern forest areas are found a large number of species of hard wood, such as oak, hickory, locust and walnut, all of which are valuable for timber. The second industry in importance is the manufacture of cottonseed oil and cake. This is followed by cotton ginning; then in their order come the production of turpentine and resin, the manufacture of cotton goods and the manufacture of cars and other railway appliances.

TRANSPORTATION AND COMMERCE. The state contains about 3000 miles of railway. Important



MISSISSIPPI
1, Jackson; 2, Vicksburg;
3, Meridian; 4, Natchez.
Dotted lines indicate chief
railroads.

trunk lines extend north and south through the eastern, central and western portions of the state. There are also lines crossing the northern and central parts of the state from east to west. All these are connected by cross lines, so that the principal towns have railway communication, but there are a number of counties yet untouched by railroads. The Mississippi constitutes a valuable waterway for all of the counties on the western border.

The commerce of the state consists in the exportation of timber and timber products, cotton and fruit and the importation of manufactured goods.

GOVERNMENT. The legislature consists of a senate and a house of representatives, the members of each being elected for four years. The regular sessions occur once in four years, but special sessions, which cannot last over thirty days except by the governor's proclamation, meet two years after each regular session, unless sooner assembled by the governor. The executive department consists of a governor, a lieutenant governor, a secretary of state, an attorney-general, a treasurer and an auditor, each elected for four years. The first and the last two named cannot succeed themselves or one another. The state judiciary consists of a supreme court of three judges, appointed by the governor and senate for nine years, and circuit and chancery courts, over which judges are appointed for terms of four years. The local government is by counties, and each county is divided into districts. The township is not recognized.

EDUCATION. Separate schools are maintained for white and for colored pupils, and in all of the larger towns these continue for nine months in the year. In the rural districts the terms are somewhat shorter. The annual expenditure for schools is about \$1,500,000, most of which is raised by local taxation. The administration of the schools is in the hands of a state board of education, composed of the secretary of state, the attorney-general and the superintendent of education. The county superintendents are appointed by this board and the senate. The state university is at Oxford, and the agricultural and mechanical college is near Starkville. There is also a state normal industrial school for girls at Columbus, a state normal school for colored students at Holly Springs and Alcorn Agricultural and Mechanical College for colored youths at Westside. The leading educational institutions maintained by the different denominations are the Mississippi

College at Clinton, Woman's College at Oxford and Millsaps College at Jackson. The higher educational institutions for colored students are the Rust University at Holly Springs and Tougaloo University near Jackson.

INSTITUTIONS. The state school for the deaf and dumb and the school for the blind are at Jacksonville. The hospitals for the insane are at Jackson and Meridian. There are also two state hospitals, located respectively at Natchez and Vicksburg. The penitentiary is at Jackson.

CITIES. The chief cities are Jackson, the capital; Meridian, Natchez, Vicksburg, Greenville, Columbus and Biloxi, each of which is described under its title.

HISTORY. The first European to pass through the region of Mississippi was the Spaniard De Soto, in 1541, but he left no settlements. La Salle took possession of the country in the name of France, in 1682. The first colony was established at Biloxi, in 1699, by d'Iberville. The territory did not prosper under French rule and was ceded to Great Britain in 1763. The colony flourished until 1781, when the southern part of it, known as West Florida, was subjugated by the Spanish. By the Treaty of 1783, the northern boundary of West Florida was placed at 31°, and a long dispute ensued until 1795, when Spain released her claim to territory north of that line. In 1798, the Territory of Mississippi was organized; in 1817, Mississippi was admitted as a state. Jackson, the capital, was founded in 1821. By treaties of 1830 and 1832 the lands of the Indians in the northern part of the state were ceded to the state and thrown open to settlement. In 1832 a new constitution was adopted. The state took radical ground against the anti-slavery cause and adopted the ordinance of secession Jan. 9, 1861. One month later Col. Jefferson Davis was elected president of the Confederacy. In or on the borders of Mississippi were fought the battles of Shiloh, Corinth, Port Gibson, Vicksburg and other smaller engagements, and much of her best territory was devastated by Union armies. During the reconstruction period, the state suffered severely from the extravagance and corruption of its carpetbag and negro rulers. It was among the first to establish a provisional government by executive order, but it was not recognized as a state until after the ratification of a liberal constitution and the acceptance of the Fourteenth and Fifteenth Amendments, in February, 1870. By a new constitution in 1890, suffrage was limited to

those able to read or interpret any passage of the Constitution. Consult Tracy's *Mississippi As It Is*.

Mississippi (from an indian word meaning *father of waters*), the principal river of North America and one of the largest rivers in the world. It has its source in Lake Itasca, in the State of Minnesota, and flows southward through a number of lakes and over a series of rapids until it reaches the Falls of Saint Anthony. Within the next six hundred miles it receives the Wisconsin, the Iowa, the Illinois and the Missouri as tributaries. The Missouri is really the main stream, as its length, before the rivers unite, is much greater than that of the Mississippi before the junction. From Saint Louis, a little below their confluence, the Mississippi becomes a broad, rapid, muddy river, liable to overflow its banks. Lower down it receives in succession the Ohio, the Arkansas and the Red rivers, and it finally enters the Gulf of Mexico through a large delta with several "passes," some distance below New Orleans.

The combined length of the Missouri and the Mississippi is about 4200 miles; the whole area drained is about 1,257,000 square miles. It is estimated that the volume of water discharged into the Gulf of Mexico is about 670,000 cubic feet per second. The Mississippi with its tributaries affords about 14,000 miles of navigable waterway. The volume of the river is usually smallest in October and greatest in April, and the low-lying lands are subject to damaging floods during the spring freshets. At many places attempts have been made to secure the river within its banks and to save the country from loss and suffering by building dikes, or *levees*, as they are called (See *LEEVEE*; *JETTY*). The sediment carried down, however, is continually raising the bed of the river, and thus breaks are frequently made in these levees. A recent method of improving the river's course is to construct light willow screens, or dams, on the shoals and at the wide places on the river where bars already exist. By this means a deposit is formed which in time will act as a bank to hem in the river, while the increased volume thus obtained will help to scour out a deeper channel.

The most important towns on the Mississippi are Minneapolis and Saint Paul, Minn.; La Crosse, Wis.; Dubuque, Iowa; Galena and Moline, Ill.; Davenport, Iowa; Rock Island, Ill.; Burlington and Keokuk, Iowa; Quincy and Alton, Ill.; Saint Louis, Mo.; Cairo, Ill.; Mem-

phis, Tenn.; Vicksburg and Natchez, Miss.; Baton Rouge and New Orleans, La.

Mississippi, UNIVERSITY OF, a state educational institution, situated at Oxford, Miss. The university was opened in 1848, but during the Civil War work was suspended. It maintains departments of liberal arts, science, pedagogy, philosophy, law, mining and civil and electrical engineering. It is affiliated with the high schools of the state, and students from approved schools are admitted without examination. The students number about 250, and there are over 20 members in the faculty. The library contains 19,000 volumes, and the institution has an endowment of \$780,000.

Mississippi Scheme, a financial scheme projected by John Law, at Paris, in 1717. Part of the scheme was for the colonization and development of the Mississippi Valley, but combined with this there was a banking plan and a scheme for the management of the national debt, the whole being supported by the French government. Such were the hopes raised by this undertaking that the shares were sold at ten, twenty, thirty and even forty times their value. People came from all parts of France, and even from foreign countries, in order to invest in the company, and there was a general mania of speculation. The state took advantage of the popular frenzy to issue increased quantities of paper money, which was readily accepted by the public creditors of Law's company. The value of the paper money depreciated, and the shares fell in price. Law, the originator of the bankrupt company, fled from France, and the state acknowledged itself debtor to the shareholders.

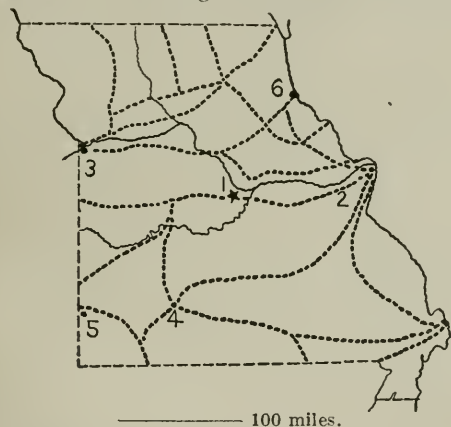
Missolonghi, *mis so lon'ge*, or **Mesolonghi**, a town of Greece, capital of the nomarchy of Acarnania and Aetolia, on the Gulf of Patras. During the Greek War of Liberation (1822-1826), the city was one of the strongholds of the Greeks. Byron died here, and his statue and a mausoleum which contains his heart are here. Population, 8394.

Missoula, *mi zoo'la*, MONT., the county-seat of Missoula co., 125 mi. w. of Helena, on the Hell Gate River and on the Northern Pacific railroad. The city has a beautiful location near snow-capped mountains, in a region which by irrigation has been made exceedingly productive of various fruits and grains. Lumbering and mining are also carried on, and there are railroad shops, planing mills, flour mills and other works. It is the seat of the state university and

has the Sacred Heart Academy and the Garden City Commercial College. Missoula was settled in 1864 and was incorporated in 1887. Population in 1900, 4366; estimated in 1903, 9000.

Missouri, *miz zoo'ri*, an indian tribe, reduced in 1823 to about eighty persons by the inroads of smallpox. The remnant joined the Oto, to whom they were related, and removed to a reservation in Oklahoma.

Missouri, the BULLION STATE, one of the West Central states, bounded on the n. by Iowa, on the e. by Illinois, Kentucky and Tennessee, on the s. by Arkansas and on the w. by the new state of Oklahoma, Kansas and Nebraska. The length from north to south



MISSOURI

1, Jefferson City; 2, Saint Louis; 3, Kansas City; 4, Springfield; 5, Joplin; 6, Hannibal.
Dotted lines indicate chief railroads.

is 287 miles, and the average width, about 255 miles; the extreme width is 305 miles. The area is 69,145 square miles, of which 680 square miles are water. The population in 1900 was 3,106,665, of which 161,234 were colored.

SURFACE AND DRAINAGE. The Missouri River divides the state into two unequal sections. That portion north of the Missouri is mostly rolling prairie, diversified by occasional hills and valleys and containing growths of timber along the streams. The portion south of the Missouri is naturally divided into three physical regions—the western plain, which is continuous with the plains of Kansas and is nearly level; the Ozark Plateau, a region of elevated hilly or mountainous country, extending across the state from east to west and continuous with the Ozark Mountains in Arkansas and Illinois, and the low, swampy lands in the southeastern part of the state. The Ozark Mountains are low, no peaks exceeding 1600 feet above sea level.

The principal rivers are the Mississippi, which borders the state on the east, and the Missouri, forming the northern part of the western boundary and then flowing across the state in a southeasterly direction to join the Mississippi a few miles north of Saint Louis. The chief tributaries of the Missouri from the north are the Platte, the Grand and the Chariton, while the Wyaconda and the Salt drain the northeastern portion of the state directly into the Mississippi. South of the Missouri and flowing into it are the Osage, the Gasconade and the Maramec, while south of the Ozark Plateau and flowing into Arkansas are the White, the Black and the Current, which is a tributary of the Black. The Saint Francis drains the southeastern plain into the Mississippi and forms the western boundary of that portion of the state extending southward opposite Tennessee.

CLIMATE. Situated in the interior of the continent, Missouri has a climate characterized by extremes of heat and cold. The summers are hot, especially in the southern half of the state, where the thermometer often reaches 100° or higher, though on the Ozark Plateau the heat is somewhat mitigated by elevation. The northern portion of the state has somewhat cooler summers and more severe winters. The average temperature for January ranges from 35° in the southern to 20° in the northern part of the state; while the July temperature varies from 80° to 75°. The annual rainfall varies from about 60 inches in the southern counties to 35 inches in the north. This is quite evenly distributed through the year, and all parts of the state usually have an abundance of moisture for agricultural purposes.

MINERAL RESOURCES. Missouri is rich in minerals. Most valuable among these are the coal deposits, occupying a large portion of the northwestern division of the state. These are a continuation of the coal fields of Kansas and Iowa. In the southwestern part of the state are extensive deposits of zinc and lead ore, which in and about Galena, Carthage and Joplin are extensively worked. The Ozark Plateau also contains extensive beds of iron ore, which are most prominent in the vicinity of Iron Mountain and Pilot Knob (See IRON MOUNTAIN). Granite, limestone, clay and other materials suitable for building purposes are widely distributed.

AGRICULTURE. The northern and western parts of the state have a deep, fertile soil and are especially suited to the growing of corn, grass,

hay and other crops suitable for feeding stock. The central part of the state is largely given to raising tobacco, while in the southern portion watermelons, tomatoes and other vegetables and fruits are cultivated. Apples are generally grown throughout the state. In the extreme south considerable attention is given to raising cotton. Throughout the state there are excellent grazing lands, and Missouri is one of the leading states of the Union in the production of live stock, especially mules, cattle and swine. The proximity of the state to the markets in Kansas City and Saint Joseph makes the fattening of cattle and hogs very profitable. Mules and blooded horses are largely exported to other states. Large numbers of sheep are also raised, and the wool crop is important. Among the cereals, corn occupies the chief place, followed by wheat and oats.

MANUFACTURES. Missouri is the leading manufacturing state west of the Mississippi River. The most important manufacturing industries are slaughtering and meat packing, the making of flour and grist mill products, tobacco and cigars, malt liquors, lumber and foundry and machine shop products. The southeastern portion of the state contains extensive forests, and the lumber interests are being gradually developed, though they do not compare in importance with those of some of the states farther south. Other industries of lesser importance are printing and publishing and the manufacturing of carriages and wagons, boots and shoes. Over two-thirds of the manufactures are located in and about Saint Louis, other important centers being Kansas City and Saint Joseph, while the smelting of zinc is carried on chiefly at Joplin and Carthage.

TRANSPORTATION. The northern half of Missouri is in the region traversed by the great trunk lines of railways, extending east and west across the country. Cross lines connect them and give this portion of the state ample railway facilities. The southern part, however, is not so well favored, and a number of counties are without railway communication. The entire mileage of the state exceeds 7000 miles. The Mississippi River furnishes ample water communication with the Gulf and the ocean. While the Missouri is navigable, the development of railways along its course has lessened its importance as a waterway.

COMMERCE. The commerce of the state is extensive. The exports are live stock, meats, lead, zinc, iron ore, fruits and vegetables and

numerous manufactured products, while the imports consist of food products and raw material for manufactures. Much of the commerce and transportation consists in the transit of commodities across the state from east to west, Saint Louis being one of the great distributing centers for the southwestern part of the United States.

GOVERNMENT. The legislature consists of a senate of 34 members elected for four years, and a house of representatives of 142 members, elected for two years. The sessions are held biennially and are practically limited to seventy days. The executive department consists of a governor, a lieutenant governor, a secretary of state, an auditor, a treasurer, an attorney-general and a superintendent of public instruction, each elected for four years. The governor and the treasurer cannot succeed themselves. The courts consist of a supreme court of seven judges, elected for ten years, and circuit courts, presided over by judges elected for six years. Each county has a probate and county court, and there are also justice courts in villages and towns.

EDUCATION. The public school system is on the district plan. At the head of this system is a board of education, consisting of the governor, the secretary of state, the attorney-general and the superintendent of public instruction. The schools in the towns are well graded, and the terms are long; but many of the rural schools, owing to scarcity of population and inadequate support, have short terms. However, these schools are making steady progress towards a higher standard. There is a compulsory attendance law. State normal schools are maintained at Warrensburg, Kirksville, Cape Girardeau, Springfield and Maryville. At Jefferson City is Lincoln Institute, for the training of colored teachers. The University of Missouri, located at Columbia, is nominally at the head of the educational system, and many of the high schools of the state are affiliated with it and, through this arrangement, with other universities as well. The other important universities are the Washington University at Saint Louis, a non-sectarian institution, and the Saint Louis University, a Roman Catholic institution.

INSTITUTIONS. The state school for the deaf and dumb is at Fulton, and the school for the blind is at Saint Louis. The hospitals for the insane are located at Farmington, Saint Joseph, Fulton and Nevada, and there is an institute for the feeble-minded at Marshall. The penal

institutions consist of a state prison at Jefferson City, a boys' reform school at Boonville and a girls' reform school at Chillicothe.

CITIES. The chief towns are Jefferson City, the capital; Saint Louis, Kansas City, Saint Joseph, Joplin, Springfield, Sedalia, Hannibal, Carthage, Moberly, Nevada, Chillicothe and Independence, each of which is described under its title.

HISTORY. Missouri was explored in 1541 by Fernando De Soto, the Spanish adventurer. In 1673 Marquette and Joliet passed its shores, and in 1682 La Salle took possession of the country in the name of Louis XIV. In 1719 the French began to explore the interior. The first permanent settlement was made at Saint Genevieve, about 1735. The next settlement of any consequence was Saint Louis, founded by Pierre Laclede in 1764. By the Treaty of Paris in 1763, Missouri, along with all territory west of the Mississippi, was transferred to Spain, and it was ceded by Spain to France in 1800; it formed part of the Territory of Louisiana, purchased by the United States in 1803. In 1812 it was set apart as the Territory of Missouri. In 1821 Missouri was admitted to the Union, after a long contest over slavery (See **MISSOURI COMPROMISE**). The people of Missouri were almost equally divided in sentiment on the slavery and secession question and provided troops for both sides during the Civil War. The Union early gained control of the state, and a loyal government was organized, which, however, was not recognized until 1864. Almost immediately after the close of the war, the state entered upon an era of wonderful prosperity. A world's fair was held at Saint Louis in 1904, celebrating the centennial of the Louisiana Purchase. Consult Carr's *Missouri*, in the American Commonwealths Series.

Missouri, UNIVERSITY OF, a state institution of higher learning, founded at Columbia, Mo., in 1839. It comprises a college of liberal arts, a graduate school and departments of education, law, medicine, military science and tactics and agricultural and mechanical arts and a school of mines and metallurgy. The faculty numbers about 150, and the enrollment is about 1900. The library contains 60,000 volumes.

Missouri Compromise, the name given to an act of Congress, approved March 6, 1820, by which Missouri was admitted to the Union as a slave state, but slavery was forever prohibited north of the southern boundary of Missouri, namely 36° 30' north latitude. At the same

time, but by a separate bill, Maine was admitted as a free state. The act was the outcome of a long period of discussion between the slavery and the anti-slavery parties. Up to that time the number of free and slave states had remained equal; therefore, the admission of Missouri as a free or a slave state would disturb this equilibrium. Many bills were introduced by each party after 1819, and the bill, as finally passed, was the result of numerous amendments and resolutions, proposed by both the House of Representatives and the Senate. Its passage was largely due to the influence of Henry Clay, then speaker of the House. In the following year another bill was passed, delaying the admission of Missouri to the Union until that state through its legislature had declared that no law would be passed which would abridge the rights guaranteed to all citizens by the Federal Constitution. This was to prevent the insertion of a proposed paragraph in the state constitution prohibiting the immigration of free negroes.

Missouri River, a great river of the United States, the principal tributary of the Mississippi. Measuring from its source to the mouth of the Mississippi, it is the longest river in the world. It is formed by the junction of the Jefferson, the Madison and the Gallatin rivers, which rise in the Rocky Mountains and unite near Gallatin City, Mont. After the junction of these three streams, the newly formed river flows first north, then east across Montana, and enters North Dakota, through which it flows in a curve southeast into South Dakota. After passing across the entire width of South Dakota, it forms the northeastern boundary of Nebraska, and after a turn toward the south, it forms the dividing line of Nebraska from Iowa and Missouri. It flows between Kansas and Missouri as far as Kansas City, when it turns east and flows across Missouri to the Mississippi, which it enters 20 miles above Saint Louis. From the source of the Jefferson, the longest of the three branches of which it is composed, to its mouth at the Mississippi, the Missouri River is 2950 miles long and with the Lower Mississippi it is 4200 miles long. It is a swift and turbid stream. Its chief tributaries are the Yellowstone, the Cheyenne, the White, the James, the Big Sioux, the Platte, the Grand and the Osage, and the chief towns on its banks are Kansas City, Leavenworth, Atchison, Omaha, Council Bluffs, Sioux City, Pierre, Bismarck and Great Falls.

Mist. See Fog.

Mistletoe, *mis' l'to*, a parasitic, evergreen plant which grows on many trees, especially on the oak and the cypress. It is a great, bushy ball of yellowish-green twigs, each bearing two rough, green leaves, with small, yellowish flowers between the leaves and at the forks of the stem. In the winter the plant is covered with small white berries. Mistletoe is found in Europe and in the United States, but while the two plants are very similar in appearance, they are not closely related. In olden times the mistletoe was regarded by the Druids with great veneration. The priests gathered the plant only with a golden knife on the sixth day after the first new moon of each year and, dividing it with great ceremony, distributed it among the people, who wore it sacredly as a charm to keep off evil. It is still a favorite Christmas decoration, and in both Europe and America it is a playful custom to claim that a man has a right to kiss a woman whom he discovers under the mistletoe on Christmas eve.

Mitchel, ORMSBY MCKNIGHT (1809-1862), an American astronomer, born in Morganfield, Ky. He was professor of astronomy in Cincinnati College from 1836 to 1844 and built its large observatory. His observations of stars and nebulae have been numerous. In the Civil War he attained the rank of major general of volunteers. Among his works are *The Planetary and Stellar Worlds*, *The Orbs of Heaven* and *The Astronomy of the Bible*.

Mitch'ell, S. D., the county-seat of Davison co., about 70 mi. w. of Sioux Falls, on the Chicago & Northwestern and two divisions of the Chicago, Milwaukee & Saint Paul railroad. The city is in a fertile region which produces wheat and live stock, and it contains a creamery, railroad and machine shops, grain elevators, brickyards, lumber yards and other establishments. It is the seat of Dakota University. The place was settled in 1879 and was incorporated four years later. Population in 1900, 4055.

Mitchell, DONALD GRANT (1822-1908), an American author, better known as Ik Marvell. He was born at Norwich, Conn., received his education at Yale and after working for some years on a farm, traveled in Europe. For a time after his return he studied law, but soon gave up that profession and turned to literature. His most popular book, *Reveries of a Bachelor*, appeared in 1850, and this was followed in the next year by *Dream Life*.

Mitchell, JOHN (1869-), an American labor leader, president of the United Mine

Workers of America. He was born in Will County, Illinois, received a limited education, later studied law and for a time was employed in Illinois coal fields. After 1885 he was closely connected with the labor union movement and after 1890 continuously held some office in the United Mine Workers of America and was also a conspicuous leader of the American Federation of Labor. He was elected president of the former in 1899 and was continuously reelected for several years. As director of the great anthracite coal workers' strikes of 1900 and 1902, he was generally commended for his moderate and reasonable attitude. He has also been prominent in the National Civic Federation.

Mitchell, MARIA (1818-1889), an American astronomer, the daughter of a school teacher in Nantucket, Mass. She was interested from an early age in astronomy, and her first publication on the subject was an account, in 1847, of the discovery of a new comet. The king of Denmark rewarded her for this discovery with a gold medal. While in the employ of the coast survey, she aided in compiling the *Nautical Almanac*. In 1857 she visited the chief observatories in Europe and in 1865 she was made professor of astronomy in Vassar. Her scientific papers are numerous.

Mitchell, SILAS WEIR (1829-), a distinguished American physician, who has achieved even more fame as a writer of essays and fiction. Doctor Mitchell's specialty is the treatment of nervous diseases, and his "rest cure" system has become the leading method in all parts of the world. He wrote essays voluminously on a great variety of medical topics and published, among other medical books, *Injuries of Nerves and Their Consequences*; *Wear and Tear, or Hints for the Overworked*, and *Lectures on Diseases of the Nervous System, Especially in Women*. In general literature, Doctor Mitchell began as a writer for children, but soon met with even greater success with his finished essays and strongly written novels. *Characteristics*; *Circumstances*; *Doctor North and His Friends*; *The Adventures of Francois*; *Youth of Washington*, and *Hugh Wynne, Free Quaker*, are among the most popular. The last mentioned, a story of Washington and the Revolution, is generally considered to be his best.

Mites, small animals belonging to the same class as the spiders. Some are so small as to be invisible to the naked eye, while others are a half-inch long. Their mouths are fitted for

boring and sucking the juices of the body they infest, for most of them are parasitic. Upon the body of the mite are scales, hairs or bristles of different forms, each characteristic of its own species. Some infest mammals, birds or animals of lower orders, and others are parasitic upon plants. The spinning mites, or *red spiders*, as they are often called, leave a tiny thread wherever they go, and when numerous they will cover a plant with a whitish mass. *Itch mites* burrow into the skin of man and other animals, and *gall mites* produce the peculiar formations seen on leaves and twigs of plants. While some mites destroy the eggs of injurious insects and so are beneficial, the majority of them are injurious, and some do decided damage, not only directly by their parasitism, but in some instances, also, by spreading disease.



MITE

Mitford, MARY RUSSELL (1787-1855), an English writer. Her first publication was *Miscellaneous Poems*, which appeared in 1810 and which was followed by other volumes. Her father, previously wealthy, lost his money, and Miss Mitford was obliged to write for a living. She produced a number of plays, among which are *Julian* and *Rienzi*, and wrote numerous articles for magazines. The most popular of her works was *Our Village*, a volume of charming sketches of village life. *Belford* and *Atherton and Other Tales* are among her other publications.

Mithridates, *with ri da' teez*, (135-63 B. C.), king of Pontus, on the shore of the Black Sea. Mithridates ascended the throne at the age of thirteen. Soon after attaining his majority, he commenced his career of conquest, which made him master of nearly all of Asia Minor and of Greece and brought him into conflict with Rome. For four years Mithridates disputed possession of Asia, but was at last compelled by Sulla to submit. After the death of Sulla, which occurred in 78 B. C., he levied another army with a determination to expel the Romans from Asia. Being defeated by Lucullus, he was followed by the victorious Romans into his own states and was driven to seek refuge in Armenia. In 67 B. C.,



MITHRIDATES

he completely defeated the Romans; and, following up his success, he rapidly recovered the larger part of his dominions. The Romans now invested Pompey with absolute power in the East, and by him, in 66, the forces of Mithridates were completely routed near the Euphrates. The king retired beyond the Caucasus, and when his troops, headed by his son Pharnaces, broke out in mutiny, he killed himself.

Mjosen, *myö'zen*, the largest lake in Norway, about 40 mi. n. n. e. of Christiania. Its length is about 55 miles, and its greatest breadth is 12 miles. Its waters are carried by the Vorma into the Glommen.

Mo'abite Stone, THE, an ancient stone discovered in 1868 in Diban, in the ancient Moab, by F. Klein. It is of black basaltic granite, about 3 feet 5 inches high, 1 foot 9 inches in width and the same in thickness, with rounded top but square base, on which there is an inscription of thirty-four lines in the Moabitish language. It was unfortunately broken by the natives, but almost the whole of the inscription has been recovered from the broken pieces. The inscription dates from about 860 B. C., and is the oldest known in the Hebrew-Phoenician form of writing. It records the deeds of Mesha, king of Moab, and his wars with Omri, king of Israel, and his successors. This stone is now in the Louvre in Paris.

Mo'berly, Mo., a city in Randolph co., about 125 mi. n. w. of Saint Louis, on the Wabash and the Missouri, Kansas & Texas railroads. The Wabash has division headquarters and shops here, and there are also brickyards, flour mills, ice factories, foundries, machine shops, planing mills and other factories. The city is near deposits of coal and fire clay and has a valuable trade in farm and dairy produce. It contains the Saint Mary's Academy, a public library and a fine Y. M. C. A. building. Population in 1900, 8012.

Mobile, *mo beel*, ALA., the county-seat of Mobile co., 80 mi. s. w. of Montgomery, on Mobile Bay, at the mouth of the Mobile River and on the Louisville & Nashville, the Southern, the Mobile & Ohio and other railroads. The city has good public schools and contains the Medical College of Alabama, the College of Saint Joseph, the Academy of Visitation, Saint Mary's School and the Magill and Evangelical Lutheran institutes. There are numerous libraries, and the charitable institutions include the United States Marine Hospital, a city hospi-

tal, Providence Infirmary and several orphanages. Of the forty churches, the Cathedral of the Immaculate Conception is the most noteworthy building. Other prominent structures are the old courthouse, the tower, the Federal building, the Cotton Exchange and the Chamber of Commerce. There is a large export trade in cotton and cotton products, lumber, coal, live stock, fruits and naval stores. The manufactures include lumber and lumber products, foundry goods, flour, cotton products, tobacco products and brick. The cultivation and the shipping of vegetables are also important industries. The first settlement was made by the French in 1702, about twenty miles up the river. It was ceded to England as a part of West Florida in 1763, was captured by the Spaniards in 1780 and was given to the United States in 1814. In 1864 Admiral Farragut defeated the Confederate fleet in the bay of Mobile and compelled the surrender of forts Gaines and Morgan. The city itself passed into Union hands April 12, 1865. Population in 1900, 38,469.

Mobile Bay, an estuary of the Gulf of Mexico, from 8 to 18 mi. wide and about 36 mi. in length. See **MOBILE BAY, BATTLE OF**.

Mobile Bay, BATTLE OF, a battle of the Civil War, fought Aug. 5, 1864, between the Federal fleet under Rear Admiral David G. Farragut and a greatly inferior Confederate fleet, supported by land batteries. The entrance to Mobile Bay was protected by Fort Morgan and Fort Gaines, and it had also been blocked with torpedoes and piles, except for a narrow passage directly under the guns of Fort Morgan. Farragut directed the course of his fleet through this narrow passage, and at the same time he conducted a continuous bombardment of the forts. Being confronted by unforeseen obstructions, Farragut was obliged to steer directly across the bay, which was thickly laid with torpedoes. Though these scraped the bottoms of the boats, only one exploded. A fierce battle ensued with the Confederate ram *Tennessee* and a few minor gunboats, and the Confederates were finally compelled to surrender. This was one of the most daring exploits of the war.

Mobile River, a river in Alabama, formed by the union of the Alabama and the Tombigbee, which unite about 45 miles above the town of Mobile. The Mobile is navigable for large steamboats. It enters Mobile Bay by two mouths.

Moc'casin Snake, a very venomous serpent, frequenting swamps in many of the warmer

parts of America, especially in the southern United States. It is about two feet in length, dark brown above and gray below. In the North, the copperhead is often called the moccasins.

Mock'ing Bird, a thrush of the southern United States, generally considered the best of native singers. It not only has a delightful song of its own, but it imitates the songs of other birds and can be taught to whistle many tunes. Its peculiar powers of mimicry often enable it to frighten other birds and to deceive even hunters and their dogs. The song of the mocking bird is always associated with the rare and lovely things of southern homes, in many of which it is a favorite cage bird. It is a rather dull colored bird, light brown above and white below, with some white on its wings and tail.

Modena, *mo'da na*, a town of north Italy, capital of a province of the same name, situated in a low but fertile plain between the Secchia and the Panaro, tributaries of the Po. It is 20 miles west-northwest of Bologna. The most remarkable buildings and establishments are the cathedral, several fine churches, the former ducal palace, the university and the public library, which contains about 130,000 volumes. The manufactures and trade are unimportant. Population of commune in 1901, 64,843.

Modjeska, *mo jes'ka*, HELENA (1844-1909), a Polish actress, born at Cracow. When seventeen years old, she married Modrzejewski, a government official of Cracow, and when she went on the stage she abbreviated the name to Modjeska. Her first appearance was in her native city, and her success there was followed by an engagement at the Imperial Theatre of Warsaw. After the death of her first husband she married, in 1868, Count Bozenta Chalpowski, and in 1876 they were led by political difficulties to emigrate to California, where they attempted to found a Polish colony. Madam Modjeska, however, returned to the stage the next year, making her first appearance in San Francisco. She made several tours through the United States and England with great success. In 1883 she starred with Edwin Booth. Her favorite rôles were Imogen, Beatrice, Juliet, Rosalind, Lady Macbeth, Camille, Mary Stuart and Cleopatra. (See portrait on next page.)

Mo'doc, a subdivision of the Klamath Indians. The women were skilful weavers, and the men were warlike and sold their captives as slaves to other Indian tribes. After a series of conflicts with the whites, during which treachery was

shown by both sides, the tragic end of the Modoc came in 1873. They had killed General Canby at a peace conference and retired to the lava beds, where, after a bitter fight, they were starved out and compelled to surrender.

Mof'fat, ROBERT (1795-1883), a Scottish missionary traveler. He began missionary work in South Africa in 1817, and his first attempts were made in Namaqualand. Later he went to Bechuanaland, where he established the station



HELENA MODJESKA

of Kuruman. During a visit to Britain, in 1842, he published an account of his travels and a translation of the New Testament and the Psalms in the Bechuana language. He received the degree of D. D. from Edinburgh University, and in 1873 he was presented with a public testimonial of \$29,000, in recognition of his very successful services. One of his daughters became the wife of David Livingstone.

Mo'gul, a word with the same meaning as Mongol, but now applied specifically to the sovereigns of Delhi, who are called Great Moguls, or Grand Moguls. They are descendants of Baber, the Mongol conqueror who established an empire in Hindustan in 1526.

Moham'med or **Mahom'et** (Arabic *Muham-mad*) (about 570-632), the founder of Islamism, an Arabian by birth, of the tribe of the Koreish. He was born in Mecca, of poor parents, who died early, and he was brought up by his uncle, Abu

Talib, who trained him to commerce, and with whom he journeyed through Arabia and Syria. In his twenty-fifth year his uncle recommended him as agent to a rich widow, named Khadija, fifteen years older than he, and he acquitted himself so much to her satisfaction that she married him and thus placed him in easy circumstances. He seems to have had from his youth a propensity to religious contemplation, for he was every year accustomed, in the month of Ramadan, to retire to a cave in Mount Hara, near Mecca, and dwell there in solitude. Mohammed began his mission in the fortieth year of his age, by announcing his apostleship to his own family. His wife was one of the first to believe in him, and among other members of his family who acknowledged his mission was his cousin Ali, the son of Abu Talib. Abu Bekr, a man of estimable character, who stood in high respect, persuaded ten of the most important citizens of Mecca to join the believers in the new apostle. They were all instructed by Mohammed in the doctrines of Islam, which were given as the gradual revelations of the divine will, through the angel Gabriel, and were collected in the *Koran*. After three years Mohammed made a more public announcement of his doctrine, but his followers were few for years. In 621 Mohammed lost his wife, and the death of Abu Talib took place about the same time. Deprived of their assistance, he was compelled to retire, for a time, to the city of Tajf. He was readily received by the pilgrims who visited the Kaaba, and he gained numerous adherents among the families in the neighborhood. Mohammed now adopted the resolution of encountering his enemies with force. This so exasperated them that they formed a conspiracy to murder him; warned of the imminent danger, he left Mecca, accompanied by Abu Bekr alone, and concealed himself in a cave not far distant. Here he spent three days undiscovered, after which he arrived safely at Medina, but not without danger (622 A. D.). This event, with which the Mohammedans begin their era, is known under the name of the Hegira, which signifies *flight*. In Medina, Mohammed met with the most honorable reception; thither he was followed by many of his adherents. He now assumed the sacerdotal and regal dignity, married Ayesha, daughter of Abu Bekr and, as the number of the faithful continued to increase, declared his resolution to propagate his doctrines with the sword. In the Battle of Bedr (623), the first of the long series of battles by which

Islamism was established over a large portion of the earth, he defeated Abu Sofian, the chief of the Koreishites. He in turn was defeated by them at Ohod, near Medina, soon after, and in 625 they unsuccessfully besieged Medina and a truce of ten years was agreed on. Wars with the Jewish tribes followed; many Arabian tribes submitted, and in 630 Mohammed took possession of Mecca as prince and prophet. The idols of the Kaaba were demolished, but the sacred touch of the prophet made the black stone again the object of the deepest veneration and the magnet that attracts hosts of pilgrims to the holy city of Mecca. The whole of Arabia was soon conquered, and a summons to embrace the new revelation of the divine law was sent to the emperor Heraclius at Constantinople, the king of Persia, and the king of Abyssinia. Preparations for the conquest of Syria and for war with the Roman Empire were begun, when Mohammed died at Medina. His body was buried in the house of Ayesha, which afterward became part of the adjoining mosque and a place of pilgrimage for the faithful in all time to come. Of all his wives, the first alone bore him children, of whom only his daughter Fatima, wife of Ali, survived him. There is no doubt that Mohammed was a man of extraordinary insight and deep reflection. Though without book learning, he had a deep knowledge of man, was familiar with Bible narratives and Eastern legends and possessed a grasp of the eternal ground of all religion, though its truths were tinged and modified by his vivid, poetic imagination.

Mohammedan Architecture or **Saracenic Architecture**, the style adopted by the followers of Mohammed in building their mosques, palaces and tombs. Originally the Arabs possessed no distinctive architectural style, and the style which they at length made their own was developed by architects belonging to the countries which they had conquered. This style is chiefly represented in Egypt, Persia, Spain, Turkey and India, but the Saracenic architecture of Spain is generally called by the distinctive name of Moorish. The most prominent features are the dome, the minaret and the pointed arch. The domes rise from a square base, are graceful in form, are sometimes in groups of three or more and are frequently enriched externally with colored tiles or other decorations. The minarets are slender towers of considerable height, rising in stages, or stories, each with a *vaucony*, and are most frequently octagonal,

sometimes cylindrical, rising, however, from a square base. The arch is of the pointed variety, sometimes of the horseshoe form. Flat surfaces are freely ornamented with a profusion of scroll work and conventional foliage, often in intricate and beautiful designs (See *ARABESQUE*). Stucco is much used in ornamentation, and brilliant coloring is especially characteristic. In Egypt the Mohammedan art began with the mosque which Amru erected at Old Cairo, about 641 A. D. Subsequently repaired and altered, it may now be considered as a good specimen of Moslem architectural art when freed from Christian influence. See *ALHAMBRA*; *TAJ MAHAL*; *MOSQUE*.

Moham'medanism, the name commonly given in Christian countries to the creed established by Mohammed. His followers call their creed *Islam* (entire submission to the decrees of God), and their common formula of faith is, "There is no god but Allah, and Mohammed is His prophet." The doctrines of Mohammedanism embrace the following points: (1) Belief in God, who is without beginning or end, the sole Creator and Lord of the universe, having absolute power, knowledge, glory and perfection; (2) belief in His angels, who are sinless beings, created of light; (3) belief in good and evil Jinn (*genii*), who are created of smokeless fire and are subject to death; (4) belief in the Holy Scriptures, which are His uncreated word revealed to the prophets, and of which there now exist, but in a greatly corrupted form, the *Pentateuch*, the *Psalms* and the *Gospels*; and in an uncorrupted and incorruptible state the *Koran*, which takes the place of and surpasses all preceding revelations; (5) belief in God's prophets and apostles, the most distinguished of whom are Adam, Noah, Abraham, Moses, Jesus and Mohammed, Mohammed being the greatest of them all, the last of the prophets and the most excellent of the creatures of God; (6) belief in a general resurrection and final judgment and in future rewards and punishments, chiefly of a physical nature; (7) the belief, even to the extent of fatalism, in God's absolute foreknowledge and predestination of all events, both good and evil.

The practical part of Mohammedanism teaches certain observances or duties, of which four are most important. The first is prayer, including preparatory purifications. At five stated periods each day, with his face turned in the direction of Mecca, the Moslem has to offer up certain prayers held to be ordained by God,

Mohave

and others ordained by his prophet. Prayers may be said in any clean place, but on Friday they must be said in the mosque. Second in importance stands the duty of giving alms; next the duty of fasting. The Moslem must abstain from eating and drinking, and from every indulgence of the senses, every day during the month of Ramadan, from the first appearance of day-break until sunset, unless physically incapacitated. The fourth important religious duty of the Moslem is making at least once in his life, if possible, the pilgrimage (el-Hadj) to Mecca, after which he becomes a Hadji. The distinctions of clean and unclean meats are nearly the same as in the Mosaic code. Wine and all intoxicating liquors are strictly forbidden. Music, games of chance and usury are condemned. Images and pictures of living creatures are contrary to law. Charity, honesty in all transactions, truthfulness (except in a few cases) and modesty are indispensable virtues. After Mohammed's death Abu Bekr, his father-in-law, became his successor, but disputes immediately arose, a party holding that Ali, the son-in-law of Mohammed, was by right entitled to be his immediate successor. This led to the division of the Mohammedans into the two sects known as Shiites and Sunnites. The former, the believers in the right of Ali to be considered the first successor, constitute at present the majority of the Mussulmans of Persia and India; the latter, considered as the orthodox Mohammedans, are dominant in the Ottoman Empire, Arabia, Turkestan and Africa. The total number of Mohammedan followers in the world is estimated at 176,834,372.

Mchave, *mo hah'vay*, a tribe of indians noted for their strength and fine physical proportions. They live on the lower Colorado River in northern Arizona, where they build log houses of brushwood covered with sand. They raise corn, pumpkins, melons and beans and make fine pottery and excellent baskets. They are a reticent, slow, contented tribe, adhering closely to their old manners and customs. They tattoo themselves and cremate their dead.

Mo'hawk, the chief tribe of the Five Nations, or Iroquoian confederacy, which formerly lived in the lower valley of the Mohawk River. They were among the earliest indians to meet the Dutch and French settlers and soon secured firearms from the former. Armed with these weapons, they became a tremendous power in the confederacy, but their position brought them quickly into conflict with the whites, by

Moldings

whom they were repeatedly defeated in battle. During the Revolution they sided with the British until, under Brant, they were driven into Canada, where they now live principally as farmers in Ontario. See FIVE NATIONS, THE; IROQUOIAN INDIANS.

Mohawk, a river of the United States, the principal tributary of the Hudson in the State of New York. It rises in Lewis County, flows in a southeasterly direction and empties into the Hudson at Cohoes. Its length is about 160 miles. It affords abundant water power and flows through beautiful scenery.

Mohe'gan or **Mohican**, *mo he'kan*, the most important tribe of Algonquian indians in the southern New England states. The Pequot were a branch of the Mohegan, but at the time of the Pequot War, the Mohegan sided with the whites, to whom they gradually lost their power, and they have disappeared or become mixed with negroes and low whites.

Moki, *mo'ke*, or **Hopi**, *ho'pe*, a tribe of Pueblo indians, that occupy seven villages on isolated tablelands of northern Arizona. These towns are all hundreds of feet above the surrounding desert, and the trails leading to them are exceedingly steep and difficult. As no other Pueblo tribe has been so little influenced by the whites, the customs of the Moki are particularly interesting. Their snake dance is a weird and uncanny performance, the indians dancing around among living rattlesnakes, which they even take into their mouths as they dance.

Molas'ses, a thick, dark-colored syrup, obtained in the manufacture of sugar. Several varieties are known to the trade, such as *West India*, *New Orleans*, *golden drip* and *sugar house*. The last named is the product of refineries, and is separated from the sugar in the drying machines. Molasses is extensively used by the poorer classes as a substitute for sugar. It is also distilled in the manufacture of rum. See SUGAR.

Moldau, *mole'dow*, the chief river of Bohemia, which, after passing through Prague, joins the Elbe. Its total length is about 350 miles.

Molda'via, formerly a Danubian principality, now a part of Rumania. See RUMANIA.

Mold'ings, in architecture, a general term applied to the ornaments in cornices, panels, bases and the like, consisting of narrow raisings or lowerings of the surface, which is curved, plane or irregular. The profile is the essential consideration in designing moldings, and in the

art of profiling, the Greeks were masters. The molding was used with excellent effect in the Ionic and Corinthian columns, which were further enriched by elaborate carvings. Moldings fell into disuse after the fourth century, but became common again in the architecture of the Middle Ages, when there was a great variety of design and form.

Molds, minute vegetable growths of a low type, especially such vegetable organisms as appear on articles of food when neglected and on decaying substances.

Mole, a little animal which, in its search for worms or larvae, burrows just under the surface



MOLE

of the ground, throwing up the excavated soil into little ridges or hills. The common mole is found in America from Canada to Florida and all over Europe, except in the extreme south and north. It is five or six inches long and has a large head, without any external ears, and very minute eyes, concealed by its short, soft fur. The common belief that the mole is blind is erroneous. Its fore legs are very short and strong, and its pointed snout is slender and strong. The male builds an underground house of many chambers, from which runways extend in all directions. There are several species of moles, but none is found in the tropics, South America or Africa. One American species has a star- or fringe-like arrangement of the cartilages about the nose, and for this reason it is called the *star-nosed mole*. Certain shrews and other burrowing insectivorous animals are sometimes called moles.

Mole Cricket, a large cricket whose front legs resemble somewhat the front legs of a mole and whose habits are similar to those of the latter animal. The common mole cricket of the United States is about one and a half inches long and is of a brown color. As in its burrowings it often bores through the roots of plants, it sometimes commits devastation in gardens. A larger species is found in South America.

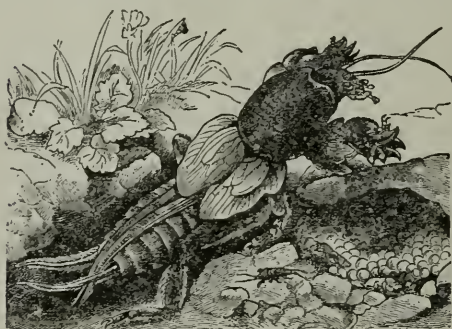
Molecule, a chemical term signifying the small particles of which matter is supposed to

consist. Molecule is, in fact, the name given to the ultimate groups of atoms of which matter is composed. In pure elementary bodies, the molecules would be actual atoms or combinations of atoms with one another, but in all compound bodies the ultimate particles are of course not atoms, but groups of dissimilar atoms. For instance, the ultimate particles of oxygen are single atoms of oxygen, but the ultimate particles of water are not atoms, sometimes of oxygen, sometimes of hydrogen, but they are molecules or combined groups, always composed either of one atom of oxygen with two of hydrogen or of a multiple of that proportion. A molecule of ammonia is composed of one atom of nitrogen and three atoms of hydrogen; an atom of muriatic acid is composed of one atom of hydrogen and one atom of chlorine.

Molecular forces are the forces which bind together the atoms into molecules and which regulate the relations of the molecules themselves, so that the body made up of them assumes the solid, liquid or gaseous state.

Molecular weights are the relative weights of molecules, and these are easily determined by chemists and are always the same for any given substance.

Molière, *mo lyair'*, (1622-1673), the assumed name of Jean Baptiste Poquelin, the greatest of French dramatists. His father was a tradesman connected with the court, and he received a good education. When the father became unable to fulfill his duties, the son took the position, but gave it up for the career of an actor, assuming in this profession the name of Molière. After



MOLE CRICKET AND EGGS

obtaining great success in the provinces, he settled in Paris in 1658, having previously produced his two comedies, *The Madcap* and *The Loving Spite*. In the following year his reputation was greatly advanced by the production of *The Absurd Précieuses*, a delicate satire on the

prevailing affectation in language, thought and dress. Continuing to produce new plays and performing the chief comic parts himself, he became a great favorite, both with the court and with the people, though his enemies, rival actors and authors, were numerous. Louis XIV was so well pleased with the performances of Molière's company that he made it specially the royal company, and gave its director a pension. In 1662 Molière made an unfortunate marriage with Armande Béjart, an actress twenty years younger than himself, and this union embittered the latter part of his life.

Among his works, other than those mentioned, may be noted *The School for Husbands*, *The School for Wives*, *Don Juan*, *The Misanthrope*, *Tartuffe*, *Physician in Spite of Himself*, *The Miser*, *Scapin's Knaveries* and *The Imaginary Invalid*. Molière died of an apoplectic stroke, a few hours after playing in *The Imaginary Invalid*. Public burial was forbidden by the archbishop of Paris, on the grounds that Molière was an actor and a reviler of the clergy; but his body was laid in Saint Joseph's churchyard. A century after his death the French Academy set up in their hall a bust of him with the inscription, "Nothing is lacking to his glory; he is lacking to ours." As a player he was unsurpassed in high comic parts; and in the literature of comedy he bears the greatest name among the moderns after Shakespeare. He borrowed freely from Latin, Spanish and Italian writers, but whatever materials he appropriated he so treated them as to make the result entirely his own.

Moline, *mo leen'*, ILL., a city in Rock Island co., about 3 mi. n. e. of Rock Island, on the Mississippi River, and on the Chicago, Rock Island & Pacific and other railroad lines. Coal is mined in the vicinity. The principal manufactures are elevators, milling machinery, scales, pianos, organs, plows and other agricultural implements, wagons, engines, and foundry and machine shop products. The city has a public library, a high school library and a well-equipped hospital. Population in 1900, 17,248.

Molino del Rey, *mo le' no del ra' ee*, BATTLE OF, an important battle of the Mexican War, fought near the battlefield of Chapultepec, three miles southwest of the City of Mexico, Sept. 8, 1847. Molino del Rey consists of a number of massive stone buildings, and it was believed by the American commanders that a cannon foundry was established there. General Worth led the attack against this position and finally compelled the Mexicans to withdraw, resisting,

as well, the assault of reinforcements under Santa Anna. The Mexican loss was 3000 killed and wounded and about 700 captured, while the loss of the Americans was about 800, all told.

Mollus'ca, counting from the lowest, the fifth great animal subkingdom, including animals which are in most cases easily distinguished by their shell, which gives them the common name of *shellfish*. In some cases, however, the body is naked and unprotected, and in others it is enclosed in a muscular sack. The shells of the mollusks are secreted by the skin or mantle and are made up chiefly of carbonate of lime, with a small proportion of animal matter. The shells are found in an almost limitless number of forms, some of which are exceedingly delicate, beautiful in shape and marvelous in color. Many of the shells are highly useful in various ways. In some, the shells consist of a single piece, often open and cup-shaped, or like a long cone, wound spirally around an imaginary axis; in a second class, the shells are two in number and are joined by a hinge, and in a third class the shells are composed of a number of different pieces. Of the latter class there are comparatively few.

The Mollusca have a distinct alimentary canal, shut off from the general cavity of the body and lying between the blood system, which follows the back, and the nerve system, which is on the lower side of the body. The digestive system consists of a mouth, a gullet, a stomach and an intestine. The blood is almost colorless. Respiration is effected in various ways. Some species have long, hair-like arms, springing from the sides of the mouth; others are adapted to breathe air directly, but the great majority breathe through gills. The typical mollusk moves about by means of a "foot," which may be modified so as to perform various other offices, such as to burrow rapidly in the sand or to secrete strong, fibrous threads, by means of which the animals moor or fix themselves to the rocks. The foot is not developed in all species, and in the cuttlefish it is represented by the arms or tentacles around the mouth. The distinctive characteristic of the Mollusca is the nervous system, which consists of from one to three masses that give off filaments in various directions. The sense organs vary decidedly, some having highly developed eyes, while others have practically none. The eyes of the land snails, for instance, are at the end of long tentacles, which are protruded from the shell while

the animal moves about. Many species pass through a free-swimming form, during the early part of their life, after which they sink to the bottom, fix themselves to a support and grow their shells. See OYSTER; CLAM; CUTTLE-FISH; PEARL.

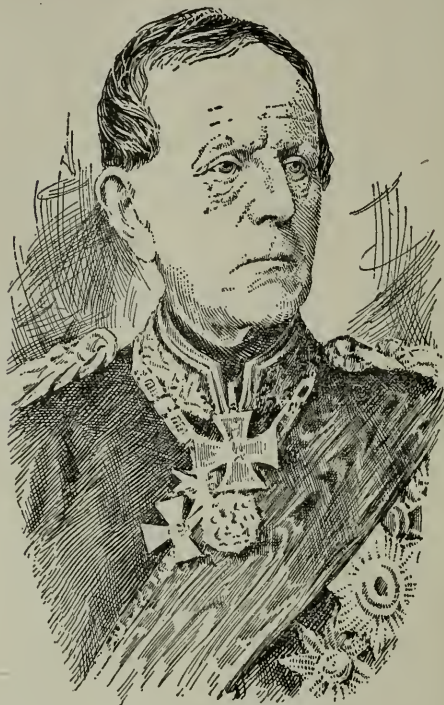
Molly Maguires, *ma gwire'z'*, a secret order organized about 1854 in the coal region of Pennsylvania. It was probably a branch of the Physical Force Party of Ireland and became notorious in the United States for the violence of its actions, amounting in many cases to assaults and assassinations. Irish Catholics only were admitted to membership, though through this membership they lost their standing in the Church. It was governed by a central organization, called the Board of Erin, which met about four times a year in England, Scotland or Ireland; but in America the organization was divided into local divisions, each with a "body master," or chief, at its head. The organization, after accomplishing much harm, was finally uprooted through the energy of Franklin B. Gowan, a prominent mine owner, and James McParlan, a detective. Many members of the society were tried, convicted and executed, and after 1877 the organization had little influence.

Moloch, *mo'lok*, a genus of lizards found in Australia. The moloch is a ferocious looking reptile, the horns on the head and the numerous spines on the body giving it a formidable and exceedingly repulsive appearance. It is, however, perfectly harmless. It is about six inches long and lives in sandy soil, feeding on ants.

Molokai, *mo lo ki'*, an island of the Hawaiian group, somewhat over 260 sq. mi. in area. It is noted for a settlement of lepers on its north coast. All persons on the islands found to be affected with the disease are sent by the government to Molokai and are kept entirely isolated from the healthy part of the community. Population in 1900, 2504. See LEPROSY.

Molt'ke, HELMUTH CARL BERNHARD, Count von (1800-1891), a Prussian general. He entered the Danish army in 1819, left that service for the Prussian three years later and became a staff officer in 1832. In 1835 he went to Turkey, superintended the Turkish military reforms and was present during the Syrian campaign against Mehemet Ali. He returned to Prussia, and from that time his rise was steady. In 1858, as provisional director of the general staff, he acted in unison with Bismarck

in the vast plans for military reorganization which so greatly increased the efficiency of the Prussian army. The success of the Danish War (1864) was attributable to him, as was also



COUNT VON MOLTKE

the success of the Austro-Prussian War of 1866; and the Franco-German War justified him in his method of drawing up a plan of campaign and directing movements from a distance, instead of joining the army in the field. In 1871 he was made field marshal, and in the following year he was given the title of count. He was retired from the position of chief of the general staff in 1888.

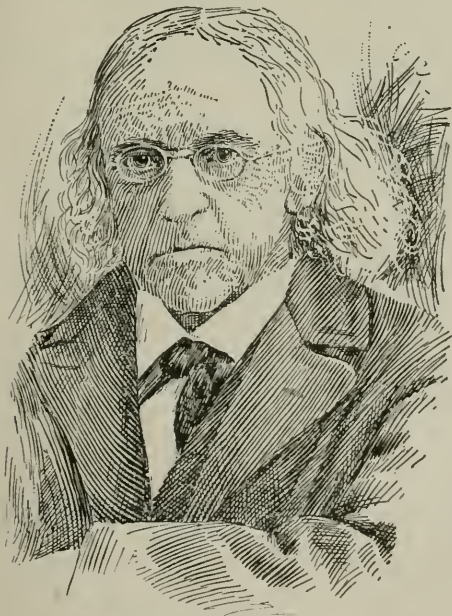
Moluc'cas or **Spice Islands**, a name applied to the widely scattered group of the Malay Archipelago lying between Celebes and Papua. The combined area of the islands is 21,516 square miles. They are divided into three residencies, Amboyna, Banda and Ternate. The southern portion is governed directly by the Dutch, while the north is ruled through native sultans. The islands are nearly all mountainous and mostly volcanic, and earthquakes are by no means uncommon. Nutmegs, cloves, coconuts, mace and sago are exported to Europe. The Moluccas have been for centuries alternately in the possession of the Spaniards, Portu-

guese and Dutch. At present they belong to the Netherlands. The natives belong to Malay and Polynesian races. Population in 1900, about 410,190.

Mombasa, *mom bah'sa*, or **Mombaz**, a town on the east coast of Africa, the capital of British East Africa, in latitude 4° 6' south, longitude 39° 49' east, on a small island which affords one of the best harbors on the coast. The town is dirty and unhealthful, but it has a considerable trade in millet, indian corn, ivory, copra, hides and rubber. Population, about 27,000.

Momen'tum, the quantity of motion possessed by a moving body. Momentum equals the mass multiplied by the velocity. A stone weighing 200 pounds and moving 20 feet per second will have a momentum of 20 times 200 pounds, or 4000 pounds. The unit quantity of momentum most commonly employed is that possessed by a body of the mass of 1 pound, moving with a velocity of 1 foot per second. The C. G. S. (centimeter-gram-second unit) is the momentum possessed by a body of the mass of 1 gram, moving with a velocity of 1 centimeter per second.

Mommsen, *mohm'zen*, THEODOR (1817-1903), a celebrated German historian and



THEODOR MOMMSEN

archaeologist. In 1852 he became professor of Roman law at the University of Zürich, and two years later he was given a similar position at

the University of Breslau. He went to Berlin in 1858 as professor of ancient history and remained there until his death. In the Prussian parliament, of which he was a member from 1873 to 1882, he became prominent as an advocate of liberal movements and as an opponent of much of Bismarck's policy. Mommsen's *Roman History* is accepted as a standard in its field, and it is one of the most notable contributions ever made to history.

Mom'pos or **Mompox**, a town in the Republic of Colombia, in South America, on the Magdalena River, 110 mi. s. e. of Cartagena. Founded in the sixteenth century, it was at one time of considerable commercial importance, but the changes of the river's course have seriously reduced its prosperity. Population, about 11,000.

Mo'mus, in classical mythology, the god of mockery and censure, who was expelled from heaven for his free criticism of the gods. Momus is generally represented raising a mask from his face and holding a small figure in his hand.

Monachism, *mon'a kiz'm*, or **Monasticism**, *mo nas'ti siz'm*. A monastery is a house of retreat from the world, where men and women devote themselves to acts of self-denial and pious work. The occupants of such places are termed monks or nuns.

The monastic vows are three in number—poverty, chastity and obedience. The vow of poverty prevents the monks from holding any property individually. Monasteries, however, professing merely a high degree of poverty, may possess real estate, yet not more than enough for their support, as in the case of the Carmelites and Augustinians. In the higher degrees a monastery may hold only personal property, as books, dress and supplies of food and drink. The Dominicans are monks of this class. The highest degree absolutely forbids both real and personal property, as is the case with the Franciscans, especially the order known as Capuchins. The vow of chastity requires an entire abstinence from familiar intercourse with the other sex, and that of obedience, entire compliance with the rules of the order and the commands of the superior.

Monasteries were first founded by Saint Anthony, in Egypt. He came from the wilderness, where he was living in rigorous seclusion, and gave those hermits less learned than himself the benefit of his wisdom and sanctity. Nearly contemporaneous with him was Saint Pachomius (315 A. D.), who founded in the

Thebaïd several monasteries of the Cenobitic order. In the beginning, each religious house had its own rule, but that of Saint Basil was ultimately adopted by the monks of western Europe. When Saint Patrick landed in Ireland, he discovered that he had been preceded by four Christian apostles, who had founded monasteries in different parts of the island. Saint Patrick founded a large number of monasteries and was emulated by many of the Irish anchorites until, in the seventh century, Ireland had monasteries which were celebrated all over Europe, not only for their sanctity, but for their learning, as well.

Western monasticism, which rapidly spread during the fifth century, was accompanied by many irregularities, until monastic vows were introduced in the sixth century by Saint Benedict, who also instituted monasteries for women. The monasteries of the West now became the dwellings of piety, industry and temperance and the refuge of learning. Missionaries were sent out from them; deserts and solitudes were made habitable by the industrious monks, and in promoting the progress of agriculture and converting the German and Slavonic nations, they rendered great services to the world from the sixth century to the ninth. Another incalculable benefit conferred upon civilization by the monasteries is the preservation of nearly the whole of the classic and medieval manuscript literature that we possess. The most famous of these great centers of piety and culture were the monasteries of Saint Gall in Germany, Saint Denis in France and Yarrow in England.

Among the most important orders for men founded in the Middle Ages were the Congregation of Cluny, the Cistercians, the Carthusians, the Franciscans and the Dominicans, on each of which a separate article will be found.

The military orders, such as the Knights Hospitallers and Knights Templars, which developed in the twelfth century, took, in addition to the usual three vows of a monk, a fourth vow of making war on the infidels, for the defense of Christendom (See KNIGHTHOOD, ORDERS OF). Among the more modern religious orders are the Capuchins and the Jesuits, which are described under their respective titles.

The earlier monastic communities for women were usually outgrowths of the orders for men. Until the seventeenth century they were nearly all cloistered communities, but now the majority of the orders take active part in charitable work among the poor, sick and ignorant. One of the oldest orders is that of the Ursuline Sisters,

founded in 1537 by Saint Angela Merici of Brescia. This is a teaching order. Their first convent instituted in the United States was founded by French nuns at New Orleans in 1727.

Mon'aco, an Italian principality lying between the French Department of Alpes-Maritimes and the Mediterranean Sea. It is about eight square miles in area and is the smallest independent state of Europe. The principality is made up chiefly of the capital, Monaco, Monte Carlo and the village of Condamine. The town of Monaco is situated on a rocky height projecting into the sea and is a renowned watering-place. Its population is about 3300. Monte Carlo, which is about a mile to the east of Monaco, consists of a collection of hotels and villas which have sprung up near the luxurious gardens of the gambling casino. The prince of Monaco exercises both legislative and executive functions in the principality, and the people are exempt from taxation, as the revenue is almost entirely derived from the rents of the gambling establishments at Monte Carlo. Population of the principality, 15,180.

Monarchy, *mon'ar ky*, a state or government in which the supreme power is vested in a single person, by whatsoever name he may be distinguished. A government in which the subjects have no right or powers as against the ruler is popularly termed *despotic*, or *absolute*, monarchy; when the ruler is subject to any law, either written or unwritten, or shares his powers with any body, the government is popularly called *constitutional*, or *limited*, monarchy (for instance, Great Britain). Monarchies are either *hereditary*, as in Great Britain, or *elective*, as was formerly the case in Poland.

Monasteries, *mon'a ster iz*. See MONACHISM.

Monbut'tu or **Mangbuttu**, a country in central Africa, extending between 3° and 4° north latitude and between 28° and 29° east longitude. Its area is about 4000 square miles, and the population is about 1,000,000. The soil is exceedingly fertile, and fine tobacco, sugar cane and other tropical crops are produced with little cultivation. The inhabitants are cannibals and practice polygamy. They have a chocolate complexion and are said to be skilful in certain arts. See RACES OF MEN, *color plate*, *Negro Types*, Fig. 6.

Monday, *mun'day*, (the moon's day), the second day of the week. *Black Monday*, any Easter Monday, because on Easter Monday in

April, the forces of King Edward III suffered from cold, mist and hail as they lay before Paris. *Blue Monday* is the Monday before Lent.

Money, the term used to denote a variety of things employed in commerce to serve one or more of the following purposes: (1) as a medium of exchange; (2) as a measure of value; (3) as a standard of value. Thus, coins (See COINING), bars of bullion, tokens, notes, checks and due bills are all called money under certain conditions, though presenting essential differences. A brief survey of the development of the complex monetary system of modern society will give the best explanation of the elasticity and uncertainty in the meaning of the word, and at the same time it will disclose the meaning of the principal functions of money.

The first commercial exchanges took place by means of barter, but the difficulties of this system were numerous, the chief one being that it required the coincidence of mutual wants at the same time and place. It was soon discovered that a common medium of exchange, which was universally acceptable, would make such a coincidence possible with much less loss of time. Accordingly, different articles were determined upon to be used as mediums of exchange; so, skins, cattle, shells, corn, cloth, salt, wampum and many other common commodities have at different times and places been used as money in this sense. But in commerce it is not only necessary that things can be exchanged for some common substance, but the rates of exchange must be measured. Accordingly, money, or the common medium of exchange, became a measure of value; but in order that transactions in which payments are to be deferred may be just and fair, a fixed and stable standard of value is needed, and money supplied this need. In order that the primary functions of money may be fulfilled, the substance which is chosen must have certain properties, of which the principal ones are *portability*, or great value in small bulk; *durability*; *homogeneity*, that is, having the same quality throughout; *divisibility*, and *stability* of value. It was soon discovered that these qualities are possessed in the highest degree by the precious metals, gold and silver. Iron is liable to rust; lead is too soft; tin is too brittle; copper is too heavy; leather and cloth lack durability. The importance of the qualities required in money varies according to circumstances. Thus, where, as in modern society, the vast majority of

transactions are effected without the intervention of material money, portability is of comparatively small importance, while stability of value is of the greatest importance in all kinds of deferred payments.

It is necessary to notice the distinction between *standard* money and *token* money. The former may be coined to an unlimited extent and is unlimited legal tender (See TENDER). Token, or representative, money has neither of these characteristics and furthermore does not equal, measured by the standard money, its face value. It merely *represents*, for convenience, an amount stamped upon its face and fixed by law. With the progress of civilization, representative money has become of more and more importance and is issued in a vast number of forms. It is made of gold, silver, lead, copper and all kinds of paper certificates, which are transferable and represent definite values. It will be seen that not only government notes and certificates, but also bank notes, checks and drafts and even, under extraordinary circumstances, private notes, are money in this sense. The use of these various things as money has been extended with the development of the credit system of business (See CREDIT).

The *value* of metallic money is a purely relative term, depending upon its purchasing power in relation to other commodities. It accords therefore with the same law as the value of other articles, namely, the law of supply and demand, *supply* in this instance being understood to mean the whole quantity of money available for use, and *demand*, the amount of work to be done by it, that is, the number of exchanges to be made by means of it. Thus, all conditions being the same, an increase in the supply of money will lower its value, and prices will show a corresponding increase, and *vice versa*. Other elements which may affect the value of metallic money are a division of labor, the use of credit and the rapidity of circulation of money, all of these factors affecting the number of exchanges which require the use of money.

Paper money is of two kinds, *convertible*, or that which is secured by metallic money for which it can be exchanged, and *inconvertible*, which is real money in itself and is purely dependent in value upon the law of supply and demand. Convertible paper money derives its value entirely from the value of the metallic money which it represents. It is therefore dependent in value upon the same conditions that regulate the value of metallic money. Paper

money was originally almost wholly convertible, but as bankers and governments came to realize that the demand for metallic money at any one time would not equal the whole amount of the outstanding notes against it, they gradually issued larger and larger sums of paper money, in excess of the actual metal held in reserve. This is called *bank money*. It is still convertible, but is based upon a reserve not equal in value to the face of the paper money. It performs all the functions of standard money and declines in value only when issued in such amounts that the ability of the issuing source to redeem it comes into question.

The monetary units of various countries, with their values in United States money, are as follows:

COUNTRY	STANDARD	VALUE
Argentina	peso	\$.965
Austria-Hungary ..	crown	.203
Belgium	franc	.193
Brazil	milreis	.546
British Honduras ..	dollar	1.000
Chile	peso	.365
China	liang or tael	about .750
Colombia	dollar	1.000
Costa Rica	colon	.465
Denmark	krona	.268
England	pound sterling	4.8665
France	franc	.193
Germany	mark	.238
Greece	drachma	.193
Guatemala	peso	.485
Honduras	peso	.485
India	pound sterling	4.8665
	rupee	.02163
Italy	lira	.193
Japan	yen	.498
Mexico	dollar	.498
Netherlands	guilder or florin	.402
Nicaragua	peso	.485
Norway	krona	.268
Panama	balboa	1.000
Philippines	peso	.500
Portugal	milreis	1.080
Russia	ruble	.515
Salvador	peso	.485
Spain	peseta	.193
Sweden	krona	.268
Switzerland	franc	.193
Turkey	piaster	.044
United States	gold dollar	1.000

See CURRENCY; BANKS AND BANKING; CLEARING HOUSE; MINT, and articles on each of the important standard coins.

Money, HERNANDO DE SOTO (1839-), an American lawyer, planter and politician, born in Holmes County, Miss. He was educated at the University of Mississippi, served in the Confederate army and in 1875 was chosen to the lower house of Congress, serving continuously for ten years and again from 1893 to 1897. In the latter year he was chosen to the United States Senate to fill an unexpired term and was reelected in 1899 and again in 1905.

Mongibello, *mon je bel'lo*. See **ETNA**.

Mongolia, a vast region of northeastern Asia, belonging to the Chinese Empire, situated between China proper and Asiatic Russia. Its area is estimated at about 1,200,000 square miles. A great part of the region is occupied by the Desert of Gobi, and on or near its borders are lofty mountain chains, the principal of which are the Altai, the Khangai and the Sayan. There is, however, some productive land in the region, and wheat, barley and millet are raised. The inhabitants lead a nomadic life, and their chief occupation is the grazing of large herds of cattle, sheep and horses. The climate is intensely hot in summer and bitterly cold in winter.

The population of Mongolia is estimated at about 2,000,000, but it is possibly much greater than this. See **MONGOLS**.

Mongolian Race or **Yellow Race**. See **RACES OF MEN**.

Mon'gols, a race of Asiatics who first came into prominence under their ruler Genghis Khan, who united the rival hordes (See **GENGHIS KHAN**). After his death, in 1227, his sons and grandsons pursued his conquests, and in 1237 they invaded Russia, devastated the country with the most horrible cruelty and in two divisions passed into Poland and Hungary. At Pesth the Hungarian army was routed with terrible slaughter, and at Liegnitz, in Silesia, Henry, duke of Breslau, was defeated in a bloody battle, April 9, 1241 (See **KUBLAI KHAN**). The principal seat of the great khan was transferred to China; the other countries were governed by subordinate khans, all of whom were descended from Genghis, and several of whom succeeded in making themselves independent. The division of the empire and the adoption of new religions (Buddhism in the East and Mohammedanism in the West) were the cause of the gradual decay of the power and consequence of the Mongols in the fourteenth century. In 1368 the empire of the Mongols in China was overturned by a revolution, which set the native Ming dynasty on the throne. Driven northward to their original home, the eastern Mongols gradually split up into small independent tribes, and finally they were subdued and absorbed by the Manchu conquerors of China. Among the western Mongols appeared a second formidable warrior, Timur, also called Tamerlane, or Timur Beg (See **TIMUR**). After Timur's death in 1405, his vast empire held together but a short time. After the commencement of the sixteenth century, the **Mon-**

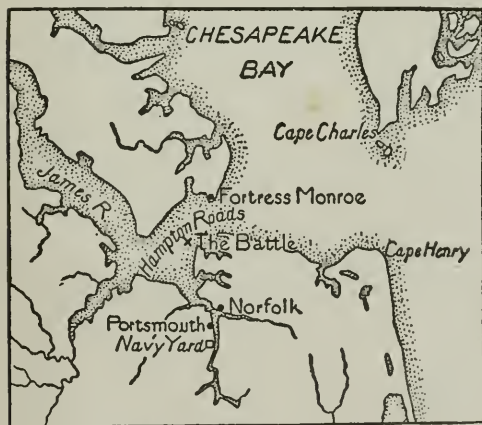
Mongoose

gols lost all importance in the history of the world, became split up into a number of separate tribes and fell under the power of neighboring peoples. Their name still lingers in the Chinese province of Mongolia (see above), but Mongolian tribes are found far beyond its boundaries.

Mon'goose or **Mongoose**, a small, reddish-gray animal which has been introduced from India into other countries for its skill in destroying rats and other vermin. It is able to kill even the most poisonous snake without injury to itself and so is supposed to be highly beneficial; but in places where it has been protected and the food supplies are good, it has increased in numbers so rapidly that harmless small animals and even poultry and domestic pets have suffered severely.

Mon'itor, the name of a genus of large lizards living in the Old World, some species of the Nile and Egypt attaining a length of six feet. They generally inhabit the neighborhood of rivers and lakes and feed upon the eggs of crocodiles, turtles and aquatic birds. The important species are the *Nile monitor*, common all over Africa, and the Ceylonese *kabara-goya*. The name *monitor* is derived from the belief formerly entertained that these lizards gave warning of the approach of crocodiles.

Monitor, **THE**, a famous ironclad war ship, constructed between October, 1861, and Janu-



HAMPTON ROADS AND VICINITY

ary, 1862, at Long Island, under the direction of John Ericsson. Its length was 172 feet, and the only portion which projected prominently above water was a turret 20 feet in diameter and 9 feet high, consisting of 9-inch armor and containing two 11-inch guns. Immediately after her launching, the *Monitor* went to Hampton

Monkey

Roads, Va., where she arrived on the evening of March 8. On the following day she met the *Merrimac*, a Confederate ironclad (See **MERRIMAC**, **THE**) which had wrought havoc among the wooden vessels of the United States fleet. After a battle of four hours, in which neither contestant was seriously injured, both vessels withdrew. This battle proved conclusively the utility of armor plate and revolving turrets upon war vessels and marked an epoch in the development of naval construction. The *Monitor* sank in a windstorm soon after the battle, while proceeding to Beaufort N. C. The name *monitor* has been given to a class of boats built upon the plans of the original *Monitor*.

Monk, *munk*, or **Monck**, **GEORGE**, Duke of Albemarle (1608-1670), an English general, famous for the prominent part he took in the restoration of Charles II. In the struggle between Charles I and the Parliament, Monk joined the royalists; but after imprisonment he joined the Covenanters and served Cromwell faithfully and with distinction till the latter's death. Then he seems to have decided at once upon the restoration of the Stuarts. The Presbyterian members who had been driven from Parliament in 1648 were recalled, to create a majority for Charles II, and the king rewarded his restorer with the dukedom of Albemarle, the Order of the Garter and a pension.

Monkey, *munk' y*, a name given to any of the family of four-handed mammals, but generally restricted to the smaller, long-tailed species. Different kinds are found in Asia, Africa and South America. Monkeys usually live in trees, and their food, which is chiefly vegetable, is stored by most species in their cheek pouches.

Of the American species, all of which have 36 teeth, as against 32 in the Old World species, the *howling monkey* is the largest and fiercest, though the least intelligent. It has a long beard and a long tail. The *spider monkey*, or



SPIDER MONKEY

coaitia, is the most graceful American monkey. Its tail serves as a hand, for not only can the monkey swing by it, but it has also a keen sense of touch. The *capuchin* also has a long prehensile tail, covered with hair to the tip. The *sakis* have bushy tails and short beards. The *sapajous*, the kind usually seen with organ-grinders, are smaller and are the most intelligent of American monkeys. The monkeys of the Old World have nostrils opening at the end of the nose. The only species found in Europe is the *macaque*, on the Rock of Gibraltar, but Africa and Asia have more than forty species. The *magabey*s are found in West Africa and are distinguished by a crown of backward-pointing hairs and by the white eyelids. One African monkey has a brown body, a bright, yellowish-green head, yellow cheeks and black tail and legs. See MACAQUE; APE; BABOON.

Monmouth, *mon'muth*, ILL., the county-seat of Warren co., on the Iowa Central and the Chicago, Burlington & Quincy railroads. The city is in an agricultural region which also contains valuable deposits of coal and clay. The principal manufactures are pottery and other clay products, agricultural implements and flour. There is also a considerable trade in dairy products and live stock. Monmouth College is located here, and the city also has a county library. The place was settled in 1836 and was incorporated in 1852. Population in 1900, 7450.

Monmouth, BATTLE OF, an important engagement in the Revolutionary War, fought at Monmouth, N. J., June 28, 1778. The Americans were commanded by Washington and the British by Clinton. It was in this battle that Gen. Charles Lee with 6000 men was ordered to attack and crush the left wing of the British army. Lee retreated without striking a blow, and it was only by the arrival of Washington that a disastrous rout was prevented (See LEE, CHARLES). The result was a drawn battle, though practically an American victory, and Clinton made his escape to New York.

Monmouth, JAMES, Duke of (1649-1685), the natural son of Charles II, was always acknowledged by Charles as his son. After the Restoration, he was created duke of Monmouth and was married to the daughter and heiress of the earl of Buccleuch. In 1679 he was intrusted with a command in Scotland and defeated the Covenanters at the Battle of Bothwell Bridge, but gained the disfavor of the king by his mercy

to the conquered and was soon afterward sent beyond seas. A few months afterward he returned without leave and became the center of the popular movement in which the lives of Lord William Russell and Algernon Sidney were sacrificed. The result to Monmouth was exile to Holland. On the accession of James II, he was induced to attempt an invasion of England. His small body of undisciplined troops was totally defeated at Sedgemoor, and the duke himself was captured and beheaded, after abject appeals to the king for mercy.

Mon'oco'tyle'dons. See BOTANY.

Mon'oma'nia, the name of a form of insanity in which the mind of the patient is absorbed by one idea or impulse and the person seems to be insane only in the one direction; in fact, in every other respect he may be of decided ability. Dipsomania and kleptomania are regarded as two varieties of monomania.

Mon'omet'allism. See BIMETALLISM.

Monon'gahe'la, PA., a city in Washington co., 30 mi. s. of Pittsburg, on the Monongahela River and on the Pennsylvania and the Pittsburg & Lake Erie railroads. Coal mining is the principal industry, and there are also glass factories, machine shops, foundries, lumber, paper and flour mills. It was settled about 1792 and was made a city in 1873. Population in 1900, 5173.

Monongahela River, one of the two rivers which unite at Pittsburg, Pa., to form the Ohio River. It is formed by the union of West Fork and Tygart's Valley rivers, in West Virginia, runs north into Pennsylvania and unites with the Allegheny at Pittsburg. Its length, not including its branches, is about 150 miles, and it is navigable for large boats for 60 miles from its mouth.

Monop'oly, the sole or exclusive right of enjoying certain privileges. In its strict sense monopoly belongs to an economic era which has passed away. During medieval times and the period that followed, exclusive rights prevailed in almost all departments. The central governments which arose on the ruins of the medieval system continued to recognize such exclusive rights, sometimes conferring on favored individuals the sole privilege of selling the most necessary articles of life, in other cases granting to great companies the monopoly of trade over immense regions of the world. Salt and coal were among the articles whose sale was thus commonly subject to monopoly. The year 1600 saw the foundation by royal charter in

England of the greatest of the companies based on the exclusive right of trade in an immense foreign market—the East India Company. The opposition to monopolies became powerful in Elizabeth's reign, and they were abolished under the Commonwealth.

The spread of freedom has tended to the abolition of monopoly, whether vested in individuals, in corporations or in companies engaged in foreign commerce. But while the monopoly of law has passed away, new tendencies toward a monopoly of fact have been setting in. Under the prevalent system, it is still the aim of the competitor to secure as far as possible the exclusive sale of the commodity in which he deals, either in the world market or over a portion of it; and when the single competitor is not strong enough to accomplish this, he seeks to attain his object by combination with a group of those engaged in the same business. The modern so-called *trust* is the outcome of such efforts; and the great danger attendant on such gigantic combinations is the establishment of a monopoly injurious to society (See TRUSTS). There are also certain monopolies, as in tobacco, retained by certain governments, for revenue purposes. It was part of the later fiscal policy of Bismarck to establish such a state monopoly in spirits. The copyright and patent laws virtually establish monopolies, but merely as an inducement for original research.

There are certain enterprises which are *natural monopolies*, that is, which of their nature preclude competition. The transportation service of a city is such a monopoly. There is a strong movement in favor of the municipal control of these enterprises (See MUNICIPAL OWNERSHIP).

Mon'othetism, the belief in, and worship of, a single, personal God; opposed to polytheism and distinct, also, from pantheism. It was at one time the general opinion that monotheism was the original form of religion, but most recent authorities now hold that it everywhere came after polytheism, as the result of gradual education. The three great modern monotheistic religions are Judaism, Christianity and Mohammedanism.

Mon'otype. This is the best representative of a class of machines which cast and set type singly, instead of in a line. The monotype has two distinct parts—the perforating apparatus, operated by a keyboard, and the type-casting and setting machine. The operation of the keys perforates a paper tape about four and one-half inches in width, and this perforated tape guides

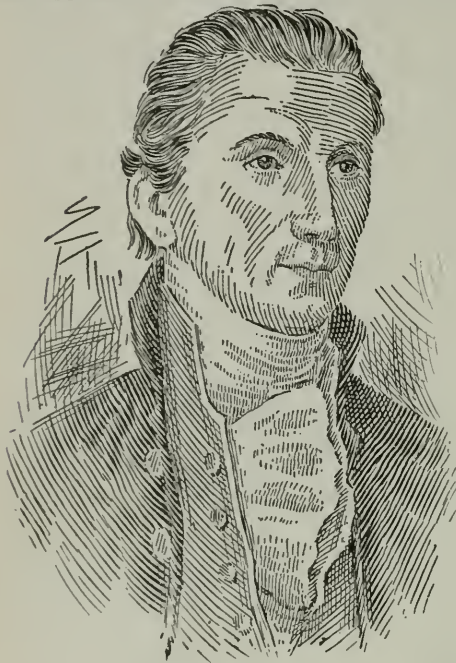
the machine in casting the type. The matrices are arranged in rows in a square frame which can move on its bed back and forth and from side to side. By these movements any matrix desired can be brought into position for casting its character. The frame holding the matrices is operated by compressed air and is brought into position by means of a series of plugs, which are pressed up or down as the perforated tape is fed into the machine. The perforations in the tape correspond to the characters required in the composition and secure the casting of these characters by elevating and depressing the plugs necessary to bring the proper matrices under the casting apparatus. The casting and setting apparatus of the monotype are quite complex, and the machine requires more than ordinary mechanical skill for its successful use. However, in the hands of a skilled operator, it does a wide range of work, as it can set a number of different sorts of type in the order called for. While the operation of the monotype is slower than that of the linotype, it is more desirable for book and magazine work, because it can set so many different sorts of type. See GRAPHOTYPE

Monroe, LA., the parish-seat of Ouachita parish, 72 mi. w. of Vicksburg, Miss., on the Queen & Crescent route and the Saint Louis, Iron Mountain & Southern railroad and on the Washita River, which is navigable all the year. The city is in a lumbering and cotton-growing region, has a considerable trade and contains cotton compresses, cottonseed oil mills, brick-yards, lumber mills and wooden ware factories. Population in 1900, 5428.

Monroe, MICH., the county-seat of Monroe co., 40 mi. s. w. of Detroit, on the Raisin River and on the Lake Shore & Michigan Southern, the Michigan Central, the Pere Marquette and other railroads. It has a public library, Saint Mary's Academy, an orphanage and a home for the aged; other prominent buildings are the armory, an opera house and a fine courthouse. The place was settled by a company of Canadians in 1784. During the War of 1812 it was the scene of a famous massacre (See RAISIN RIVER, MASSACRE OF). Monroe was incorporated as a city in 1836. Population in 1904, 6128.

Monroe, JAMES (1758-1831), an American statesman, fifth president of the United States of America. He was born in Westmoreland County, Va., and was educated at William and Mary College, his studies being interrupted by services in the Revolutionary army. At the

close of the war he devoted himself to the study of law, in 1782 and 1787 he was elected a member of the Virginia Assembly and from 1783 till 1786 represented Virginia in Congress. In 1788, as member of the convention of Virginia, he strenuously opposed the ratification of the new Federal



JAMES MONROE

Constitution, but in 1790 he accepted election to the Senate of the United States, where he was an ardent Anti-Federalist. From 1794 to 1796 he was minister plenipotentiary to France, being recalled for expressions of opinion which Washington considered indiscreet and dangerous. This caused bitter party feeling.

From 1799 till 1802 Monroe was governor of Virginia, and in 1803 he returned as envoy extraordinary to France with Robert R. Livingston, on a mission which resulted in the acquisition of Louisiana. He was afterward employed in diplomacy in England and Spain, but was not successful. In 1811 he was again governor of Virginia and in the same year became secretary of state, acting also as secretary of war for a time. In 1816 the Democratic-Republican party elected him to the presidency of the United States. In 1820 he was reelected, only one vote being cast against him, owing to the breaking down of party lines. He also had gained remarkable popularity by securing the cession of Florida from Spain and

by the settlement of the vexed question of the extension of slavery by the Missouri Compromise. Mexico and the emancipated states of South America were formally recognized by the American government during Monroe's second term; but its chief event was the promulgation of the "Monroe Doctrine" (See MONROE DOCTRINE). This period is known as the "Era of Good Feeling." See ERA OF GOOD FEELING.

Monroe Doctrine, broadly stated, the policy promulgated by the United States government of preventing interference by European powers in the political affairs of American nations, and, especially, its opposition to the extension of monarchical institutions in the western hemisphere. The occasion of the first definite utterance of this policy was in 1823, when it was suspected that a so-called Holy Alliance, consisting of Russia, Austria, Prussia and France, aimed to interfere in America to restore to Spain the colonies which had gained their independence and had been recognized by the United States. In his message of December 2, 1823, President Monroe declared that "the American continents are henceforth not to be considered as subjects for future colonization by any European power. With the existing colonies or dependencies of any European power we have not interfered and shall not interfere. But with the governments which have declared their independence and maintained it, and whose independence we have acknowledged, we could not view any interposition for the purpose of oppressing them, or controlling in any other manner their destiny, by any European power, in any other light than as the manifestation of an unfriendly disposition toward the United States."

This doctrine has been differently interpreted at various junctures in American history, but its general spirit has been followed with scarcely an exception for three quarters of a century. Two years after its announcement it was successfully invoked to prevent Spain from transferring Cuba to France or England. The first and only important instance of disavowal or disregard of the doctrine was in the signing of the Clayton-Bulwer Treaty of 1850, in which England and America agreed not to occupy, fortify, colonize or assume any dominion over any part of Central America, but joined in guaranteeing the proposed canal across the Isthmus of Panama. By this act the United States admitted Great Britain to an equal footing with itself in an undertaking purely American in scope and character.

Monrovia

The Monroe Doctrine proved its force and efficiency soon after the close of the Civil War, when the French army, which had established the unfortunate Maximilian upon the throne of Mexico, withdrew at the suggestion of Secretary Seward, supported by a movement of American forces toward the Mexican frontier. Again in 1880 President Hayes announced, in regard to the proposed canal under French control across the Isthmus of Panama, the following policy: "No European power can intervene for such protection [of the capital invested in the canal] without adopting measures on this continent which the United States would deem wholly inadmissible"; this gained an avowal from the French cabinet that the government was in no way interested in the enterprise. By far the most important of recent events relating to the Monroe Doctrine was the Venezuela episode of 1894 and 1895, in which President Cleveland, by a firm avowal of a broad interpretation of the doctrine, led Great Britain and Venezuela to refer their dispute as to boundaries to a friendly arbitrator.

In recent years the interpretation of the Monroe Doctrine has been upon much more liberal lines than formerly, and it is now held by many American statesmen that it can be justified only upon the condition that American nations treat European nations honestly and candidly, and that therefore the United States is responsible to a certain extent for the international relations of smaller American republics.

Monro'via, a seaport of West Africa, the capital of Liberia, situated at the mouth of the Saint Paul River. It exports coffee, palm oil, dyewoods and rubber. It was founded in 1824 and was named after President Monroe (See **LIBERIA**). Population, about 5000.

Mons, *mohNs*, a town of Belgium, capital of the Province of Hainault, 35 mi. s. w. of Brussels. It was until 1862 one of the strongest fortresses of Europe, but the fortifications were then destroyed, and their site is now occupied by a boulevard. The principal buildings are the Gothic Cathedral of Saint Waltrudis, which dates from the fifteenth and sixteenth centuries; the townhall, which was built in the fifteenth century; the courthouse; a school of arts, and a library of over 70,000 volumes. The town has manufactures of linen, woolen and cotton fabrics, iron, cutlery and soap. Coal is extensively mined in the vicinity. Mons is supposed to occupy the site of one of Caesar's camps. It has figured much in history. Population in 1900, 27,015.

Montaigne

Monsoon', the name given to a certain modification or disturbance of the regular course of the trade winds which takes place in the Arabian and Indian seas. Between the parallels of 10° and 30° south latitude, the eastern trade winds blow regularly, but from the former parallel northward the course is reversed for half the year, and from April to October the wind blows constantly from the southwest. During the other six months of the year the regular northeast trade wind prevails. These winds are caused by the unequal heating of the land and sea at the different seasons, and the name is now applied to all land and sea breezes of importance, wherever they occur. See **WIND**.

Mon'tagu, or *mun'ta gu*, **MARY WORTLEY**, Lady (1689-1762), an English writer, chiefly known for her brilliant letters. She was the eldest daughter of Evelyn Pierrepont, afterward duke of Kingston. In 1712 she married Mr. Edward Wortley Montagu, who two years later obtained an official position in London. Lady Mary's wit and vivacity speedily made her exceptionally popular, and she won the friendship of many of the most eminent men of her day, among them Addison, Congreve and Pope. In 1716 she was in Turkey with her husband, who was ambassador at Constantinople, and during her residence abroad she wrote her famous *Turkish Letters*. After her return to England she became involved in a quarrel with Pope, and he frequently assailed her in his poetry. Lady Mary Wortley Montagu has another claim to remembrance, namely, her adoption of the practice of inoculation for smallpox. This she learned while in Turkey, and its introduction into England was due largely to her efforts.

Mon'tague, **MASS.**, a town of Franklin co., on the Central Vermont and the Fitchburg railroads. It includes a number of villages, among which is Turner's Falls, and it has numerous manufactures, the chief of which are cotton goods, paper, cutlery, soap and bricks. The town was settled in 1716 and was incorporated in 1753. Population in 1905, 7015.

Montaigne, *mon tane'*, **MICHEL EYQUEM DE** (1533-1592), a famous French essayist, born at the castle of Montaigne, in Périgord. He was a parliamentary counselor from 1557 to 1567 and at some period was appointed a gentleman of the chamber to the king. In 1571, however, he retired to his estate and devoted himself to study. In 1575 he set out on a journey through Germany, Switzerland and Italy, to

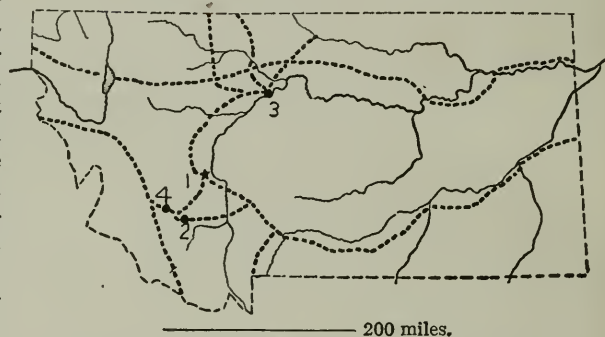
restore his health, which had been shattered by the attacks of an hereditary disease. After a last visit to Paris, he seems to have dwelt quietly in his chateau. Montaigne's essays have at all times been one of the most popular books in the French language. They embrace an extraordinary variety of topics, which are touched upon in a lively, entertaining manner, with all the raciness of strong, native good sense, careless of system or regularity. Sentences and anecdotes from the ancients are interspersed with his own remarks and opinions and with stories of himself in a pleasant strain of egotism. There is an English translation of the essays by Florio, made in 1603, and reëdited by Charles Cotton.

Montan'a, the TREASURE STATE, one of the northwestern states, bounded on the n. by the provinces of Alberta and Saskatchewan, Can., on the e. by North Dakota and South Dakota, on the s. by Wyoming and Idaho and on the w. by Idaho. The greatest length from east to west is 540 miles, and the average width from north to south, 275 miles. The area is 146,080 square miles, of which 770 square miles are water. The population in 1900 was 243,329, of which 11,343 were indians.

SURFACE AND DRAINAGE. The eastern two-thirds of the state belongs to the great central plain, and the surface consists almost entirely of rolling prairie, interspersed here and there with low hills, bluffs along the streams and isolated buttes. Many of these bluffs have been sculptured in a wonderful manner by the winds. The main range of the Rocky Mountains extends across the state from the western boundary of Wyoming in a northwesterly direction, and the Bitter Root range, to the west of this, forms most of the western boundary. These ranges are separated by a wide basin, which contains numerous cross ranges and spurs. The elevation varies from 1800 feet, in the northeastern corner of the state, to between 11,000 and 12,000 feet, in the highest peaks of the Rocky Mountains; but the average altitude of the main divide is about 6500 feet, while that of the Bitter Root range is between 7000 and 8000 feet. Most of the mountainous portion of the state is heavily timbered with pine, spruce, tamarack and some hard wood.

The principal mountain range constitutes the "Continental Divide," which separates the basin of the Missouri from that of the Columbia.

That portion of the state west of the Rocky Mountains is drained by the Clark River and its tributaries into the Columbia. The region east of the mountains is drained by the Missouri, which is the most important stream in the state. It rises in the extreme southwestern part of the state and flows northerly, then easterly, till it reaches the eastern boundary. Its chief tributaries are the Yellowstone and the Mussel Shell, flowing into it from the south. The important tributaries of the Yellowstone are the Teton, the Sun, the Milk, the Marias, the Porcupine and a number of smaller streams. All of these streams flow through well-worn channels. The Missouri is navigable to Fort Benton, and the Yellowstone is navigable through the lower part of its course. The



MONTANA

1, Helena; 2, Butte; 3, Great Falls; 4, Anaconda.
Dotted lines indicate chief railroads.

state contains only one lake of importance; that is Flathead Lake, in the northwestern county.

CLIMATE. The climate is dry and, considering the latitude of the state, milder than one at first would suppose. Like other interior regions, Montana experiences a wide range of temperature. In winter the temperature falls occasionally as low as 40° or 50° below zero, while in summer it sometimes rises to over 100° above. The mean annual temperature for the state is about 11° for the coldest month and 70° for the warmest. The chinook winds (See CHINOOK) give the region over which they blow much milder winters than it would otherwise have. Because of the dryness of the atmosphere, the changes in temperature are not felt to as great an extent as they are in regions near large bodies of water. The rainfall is light, averaging about 12 inches for the state. In the northwestern part of the state there is usually enough moisture for successful agriculture; but in other

parts irrigation is advantageous, if not absolutely necessary.

MINERAL RESOURCES. Montana is one of the richest states in minerals, and the development of its mines has been its leading industry. The state contains large deposits of bituminous and lignite coal, copper, gold, silver and precious stones. The great copper region is around Butte and Anaconda. Butte is the largest mining center in the world, producing in copper alone over 4,500,000 tons per year. Montana leads in the production of copper, its yearly output being nearly 40 per cent of that produced in the United States (See COPPER). Silver and gold are mined in numerous localities, and since the discovery of these metals in the state, Montana has produced many million dollars' worth. The bituminous coal is of good quality, and its annual production is constantly increasing; the mining of sapphires has also become an important industry.

AGRICULTURE. The eastern part of the state is too dry for agriculture, except where irrigation is possible. The soil is generally fertile, and wherever water can be obtained, abundant crops are raised. Without irrigation, however, the region is remarkably well adapted to raising live stock. Montana leads in the raising of sheep and the production of wool, its annual output of wool exceeding 26,000,000 pounds. The bunch grass and buffalo grass found on these plains are remarkably nutritious and well suited to fattening stock, and because of the mild climate in most regions stock can run at large through the winter without protection; hence, the eastern portion of the state is largely devoted to the live stock industry. The western part of the state between the mountains usually has sufficient rainfall for agricultural purposes, though here irrigation is of great advantage. The chief crops are hay, oats, wheat, barley and potatoes. In the mountain valleys are found large orchards, as this region is remarkably well suited to the raising of apples and other orchard fruits. Horticulture is here becoming an important industry.

MANUFACTURES. The principal manufactures are directly or indirectly connected with the mining industries. The most important manufacturing industries consist in the smelting and refining of ore and the production of lumber. The greatest smelting works are located at Anaconda, Butte, Great Falls and East Helena. Lumber is manufactured extensively at Hamilton, Bonner and other points. Coke is manu-

factured in the vicinity of the coal mines and is used in the smelters. There are also numerous breweries; in some localities slaughtering and meat packing have been commenced, and the manufacture of flour and gristmill products is quite general. The chief agricultural sections are the valleys of the Bitter Root, the Flathead, the Yellowstone and the Gallatin. The latter valley produces the finest barley in the world.

TRANSPORTATION. The state is crossed from east to west by two great trunk lines of railway, the Great Northern, in the north, with a branch line from Havre to Butte, and the Northern Pacific, in the central and southern portion. The Oregon Short Line also enters the state from the south and extends to Butte. The Chicago, Burlington & Quincy and the Chicago, Milwaukee & Saint Paul systems are entering the state and pushing their lines westward to the coast. These lines, with a number of spurs and cross lines, give fairly good transportation facilities to the portion of the state through which they pass. Between these lines of railway there is a large area yet without railroad communication, and stages are the only means of conveyance. In the mountain regions pack horses and mules are in general use for conveying supplies, and on streams ferry boats and other craft are employed wherever this can be done to advantage.

GOVERNMENT. The state legislature consists of a senate of 27 members, elected for four years, and a house of representatives of 73 members, elected for two years. The legislature meets every two years, the session being limited to sixty days. The executive department consists of the governor, the lieutenant governor, the secretary of state, the attorney-general, the treasurer, the auditor and the superintendent of public instruction, each elected for four years. The courts consist of a supreme court of three judges, elected for six years, and such district courts as may be created by the legislature, each district having one or more judges elected for four years. The local administration is by counties; it is in the hands of three commissioners for each county and the other usual county officers.

EDUCATION. The public school fund is obtained in large part from the sale and lease of school lands. This is supplemented, also, by state and local taxation. The state has a strict compulsory education law, and the school system provides for the establishment of common schools and county high schools when-

ever there is a demand for them. Nearly half of the counties of the state now have well-established county high schools. The University of Montana, at Missoula, is at the head of the educational system. There is a state normal school at Dillon, an agricultural college at Bozeman and a school of mines at Butte. Besides these, there are a number of colleges and secondary schools in the state, maintained by religious denominations.

INSTITUTIONS. The school for the deaf and blind is at Boulder, the state orphans' home is at Twin Bridges and the state soldiers' home is at Columbia Falls. The state does not maintain a hospital for the insane, but provides for their care by private contract. The hospital is located at Warm Springs. The penitentiary is at Deer Lodge and a reformatory is at Miles City.

CITIES. The chief towns are Helena, the capital; Butte, Great Falls, Anaconda, Missoula, Bozeman and Billings, each of which is described under its title.

HISTORY. The territory of Montana was first visited by the French in 1742, and later by Jesuit missionaries, fur traders and trappers. Most of it was included in the Louisiana Purchase of 1803, and it was explored by Lewis and Clark in 1805. The first permanent settlement was at Fort Benton in 1840. In 1861 rich gold fields were discovered, and the following year mining began in earnest. The territory was organized in 1864, being formed of a part of the old Territory of Idaho. In 1876 the famous Custer massacre occurred on the Little Bighorn River. The development of silver and copper mines and the construction of railroads brought prosperity to the region, and in 1889 Montana was admitted into the Union. Consult Bancroft's *Idaho and Montana*.

Montana, UNIVERSITY OF, a state university, opened at Missoula in 1895. It now has courses in classics, philosophy and general and applied science. A preparatory department is maintained, and there is provision for graduate work. The university also maintains a summer school. The income is derived from a grant of land, made by Congress in 1892, and from state appropriations. The university is co-educational, and about half of the students are women. There are fourteen members on the faculty, and there are over 300 students.

Mont Blanc, *mohN blahN*, (white mountain), a celebrated mountain, the highest in Europe, belonging to the Pennine chain of the

Alps, situated on the frontiers of France and Italy and near that of Switzerland. Its height is about 15,781 feet. The main portion of the mountain and the highest summit are in France. The huge mountain mass is about 30 miles long, about 10 miles wide and has numerous summits, some rounded, some sharp. On the southeast, its face is steep; on the northwest, lateral chains are sent off. The highest summit is always covered with a great ice cap, from which glaciers extend in all directions. Of these glaciers, the most famous is the Mer de Glace. The summit of Mont Blanc was first reached in 1876 by Jacques Balmat, a mountain guide.

Montcalm de Saint-Veran, *mohN kahlm' de saN va rahN'*, LOUIS JOSEPH, Marquis de (1712-1759), a French general. He entered the army in 1726, distinguished himself in several campaigns in Europe and in 1756 was appointed to the chief command of the French troops in Canada. His brilliant success began with the capture of Fort Ontario, and he afterward took Fort William Henry, on Lake George, and occupied Ticonderoga, which he successfully defended against a greatly superior force of British. He then withdrew to Quebec, where he prepared to meet the British in a decisive conflict. In July, 1759, the attack began, and the British were at first repulsed; but Wolfe led his forces to the Heights of Abraham, a plateau above Quebec, and there the two armies met. At length the French were driven back, and in the final charge both Wolfe and Montcalm were mortally wounded. Montcalm's last words were, "Thank God, I shall not live to see the surrender of Quebec."

Mont Cenis, *mohN se ne'*, **Tunnel.** See CENIS, MONT, TUNNEL OF.

Mont Cervin, *mohN ser vaN'*. See MATTERHORN.

Montclair, N. J., a town in Essex co., 5 mi. n. w. of Newark, on the Lackawanna and the Erie railroads. It is a beautiful residence place, being located on one of the ranges of the Orange mountains, at an average elevation of about 300 feet, affording a good view of New York City and harbor. The town has a hospital, two orphan asylums, a public library, Montclair Military Academy and a good high school. It was first incorporated as a separate town in 1868. Population in 1905, 16,370.

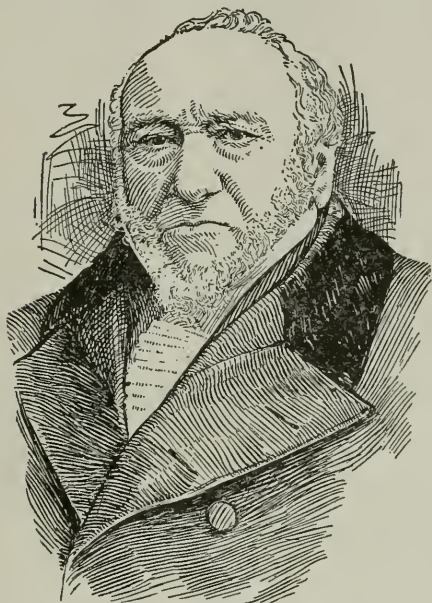
Mon'te Carlo, *kahr'lo*. See MONACO.

Mon'te Cristo, a small island in the Mediterranean, located about 26 mi. s. of Elba and belonging to Italy. It is the seat of a penal

Montefiore

colony. Dumas made this island famous through *The Count of Monte Cristo*.

Mon'tefio're, MOSES, Sir (1784-1885), a Jewish philanthropist. In 1837 he was chosen sheriff of London, the same year he was knighted,



SIR MOSES MONTEFIORE

and in 1846 he was made a baronet. His benevolence to Jews throughout the world was unbounded; and he visited Palestine seven times, the last time at the age of ninety-two.

Montenegro, *mon ta na' gro*, (black mountain), an independent principality in Europe, northwest of Turkey, bounded by Herzegovina, Albania, the Adriatic, Dalmatia and the Turkish sanjak of Novipazar. Its area is about 3600 square miles, or three-fourths that of Connecticut. The surface is everywhere mountainous, being covered by an extension of the Alps, which rise in places to a height of over 8000 feet. There are, however, a few beautiful plains and valleys, in which the soil is tolerably fertile. The principal streams are the Moratcha and the Zeta, which join and empty into the lake of Scutari, on the border between Montenegro and Albania. The climate of Montenegro is healthful. Forests of beech, pine, chestnut and other valuable timber cover many of the mountain sides, and fruit trees of all kinds abound, especially in the sheltered valleys, where almonds, vines and pomegranates ripen. Agriculture is in a very primitive state, though every piece of land which can be cultivated is

Monterey

planted with cereals, tobacco, potatoes, rye or some other useful plant. Sheep, cattle and goats are raised in large numbers, and the chief occupation, besides stock raising, is fishing. Trade is left almost altogether to foreigners, and manufactures, with the exception of a coarse woolen stuff, are unknown. The exports are sheep and cattle, sumac, honey, hides and smoked fish.

The Montenegrins are of the Servian race and speak a Servian dialect. They are generally tall and well-proportioned. The men are at almost all times fully armed, whatever be the occupation in which they are engaged, and all between fourteen and fifty years of age are liable to military service. In religion they are of the Greek Church. Education, once neglected, is now free and compulsory. The government is nominally a constitutional monarchy, but the prince is practically absolute. The chief towns, which are in reality little more than villages, are Cetinje, the capital; Podgoritz, Nikshitch, Dulcigno and Antivari.

The history of Montenegro for many years is a record of deadly struggles with the Turks and of a slow-growing civilization among the inhabitants. From the early part of the sixteenth century the ruler of the country was the vledika, or prince-bishop, but in 1855 the vledika Danilo threw off his ecclesiastical character, took the title of prince and transformed his land into a secular principality, the independence of which was soon recognized by Russia. Danilo was assassinated in 1860, and Nicholas I became prince. In 1862 he engaged in a war against Turkey which proved not altogether successful, but in 1876 Montenegro again went to war with Turkey, and by the Treaty of Berlin it gained almost 2000 square miles of territory. Population, about 225,000.

Monterey, *mon ta ray'*, a city of Mexico, capital of the State of Nuevo Leon, about 100 mi. from the Texas frontier. It is a well-built city, with some fine buildings and well-kept streets. It has a considerable transit trade and manufactures woolen goods and carriages. Population in 1900, 62,266. (See MONTEREY, BATTLE OF.)

Monterey, BATTLE OF, an important battle of the Mexican War, fought Sept. 21, 1846, between an American force of 6700 men, under General Taylor, and a Mexican force of 10,000, under General Ampudia. The battle continued for three days, the Americans under General Worth finally compelling the Mexicans to sur-

render, though with extraordinary honors. The terms of the capitulation caused much discussion, open dissatisfaction being expressed by American officers.

Monte Rosa, *mon'ta ro'sah*. See **ROSA**, **MONTE**.

Montesquieu, *moN t's kyö'*, CHARLES LOUIS DE SECONDAT, Baron de la Brede et de (1689-1755), a celebrated French writer. He studied law, became a councilor of the parlement of Bordeaux and in 1716, on the death of his uncle, became president of the parlement and Baron de Montesquieu. The *Persian Letters*, the first of the three great works on which his fame principally rests, appeared in 1721. Purporting to consist of the correspondence of two Persians traveling in France, this book is a lively satire upon the manners, customs and political and ecclesiastical institutions of the author's age and country. In 1728 Montesquieu was admitted to the French Academy. Six years later he published *On the Causes of the Grandeur and Declension of the Romans*, and in 1748 the publication of his *Spirit of the Laws*, the result of twenty years of labor, at once placed him among the great writers of his country. The scope of the work is perhaps best indicated by the sub-title of the original edition, which describes it as a treatise on the relation which ought to exist between the laws and the constitution, manners, climate, religion and commerce of a country.

Monteverde, *mon ta vair'dai*, CLAUDIO (1567-1643), one of the earliest of great Italian composers. He contributed much to the science of harmony, was a pioneer in the construction of operas and practically revolutionized instrumentation. His principal works were the operas *Orfeo* and *Arianna*. See **MUSIC**; **OPERA**.

Montevideo, the capital of Uruguay, situated on a peninsula on the north coast of the estuary of the Rio de la Plata, 120 mi. e. s. e. of Buenos Ayres. It is one of the best-built towns of South America and has an exceptionally fine climate. The principal buildings are the cathedral, the town house, the castle, the government building, a national museum and several theaters. There is a university which has about 700 students. The commercial development of Montevideo, considerable as it is, has been much retarded by the shallowness of the harbor, which according to plans made in 1899 has of late been much improved. Extensive dry docks have also been constructed recently. The chief exports are hides, wool, tal-

low, dried beef and other animal products. The chief imports are cottons, hardware and other manufactured articles. Montevideo sends out above half of the exports of Uruguay and receives all but a small fraction of the imports. Population, 139,866; with suburbs, 192,241.

Montezuma, the Aztec emperor of Mexico when Cortez invaded the country in 1519. Influenced by an ancient prophecy, he at first welcomed the Spaniards; but when he discovered that they were not supernatural beings, he secretly took measures for their destruction. Cortez, on learning this, seized Montezuma and compelled him to recognize the supremacy of Spain. The Aztecs immediately rose in revolt and refused to be quieted by the appearance of Montezuma. While urging them to submission, he was struck on the temple with a stone and fell to the ground. Cut to the heart by his humiliation, he refused all nourishment, tore off his bandages and soon after expired. See **AZTEC**; **CORTEZ**, **HERNANDO**.

Montfort, **SIMON DE**, Earl of Leicester (about 1208-1265), an English statesman, famous in the constitutional history of England. Although born in France, he identified himself with the English barons when they rose against Henry III and demanded the redress of grievances. Under the leadership of Montfort, the barons were able to wrest from the king a promise to abide by the measures known as the Provisions of Oxford. When the pope absolved Henry from his agreement, Montfort objected and Louis IX of France was chosen as arbiter. Again the question was decided in favor of Henry, and in 1264 the nobles under Montfort took arms to compel the king to carry out his promises. The king was defeated at Lewes, was made prisoner and was compelled to make even more humiliating terms with the barons than had been made by the Provisions of Oxford. As virtual ruler of the country, Montfort summoned an assembly in 1265 which is memorable as the first Parliament at which representatives of the boroughs were present. Later in the same year, war again broke out between the barons and the royal party, and in a battle with Henry's son, Prince Edward, Montfort was killed.

Montgomery, *mont gum'ur y*, **ALA.**, the capital of the state and the county-seat of Montgomery co., 180 mi. n. e. of Mobile and 96 mi. s. by w. of Birmingham, on the Alabama River and on the Louisville & Nashville, the Mobile & Ohio, the Atlantic Coast Line and other rail-

Montgomery

roads. The city is situated on red clay bluffs and is surrounded by the famous black belt, which is productive of cotton, grain and many kinds of fruits and vegetables. Among the prominent structures are the state capitol, a fine Confederate monument, the city hall, the Federal building and Estelle Hall, which is historically interesting from its many political gatherings. There is also a state normal school, a Baptist academy, La Grange Academy and the Montgomery Industrial School for Girls, besides various charitable institutions and libraries.

The city is an important market for raw cotton and contains many cotton factories. Forests of yellow pine and deposits of coal, iron and clay are found in the vicinity, and some of the important establishments are foundries, railroad car and repair shops, brickyards, marble works and various factories. New Philadelphia was founded in 1817; East Alabama Town in 1818, and the two were united to form Montgomery in 1819. It was incorporated as a city in 1837, and nine years later it succeeded Tuscaloosa as the state capital. It was the seat of the Confederate government from February to May, 1861. Here the first Confederate congress assembled. Population in 1900, 30,346; population in 1905, estimated from the city directory, 48,788.

Montgomery, RICHARD (1736-1775), an American general, born in Ireland. After serving with credit in the English army and distinguishing himself during the last French and Indian war, he emigrated to New York, and in 1775 he was a delegate to the first provincial convention. At the outbreak of the Revolution he was given a command in the Continental Army, was made second in command in an expedition to Canada and succeeded in capturing Montreal. He was killed during an attack on Quebec.

Month, *month*, a period of time derived from the motion of the moon, generally one of the twelve parts of the calendar year. The calendar months have from 28 to 31 days each, February having 28, April, June, September and November, 30, the rest, 31. *Month* originally meant the time of one revolution of the moon, but as that may be determined in reference to several celestial objects, there are several lunar periods known by distinctive names. Thus, the *anomalistic month* is a revolution of the moon from perigee to perigee; average, 27 days, 13 hours, 18 minutes, 37.4 seconds. The

Montpellier

sidereal month is the interval between two successive conjunctions of the moon with the same fixed star; average, 27 days, 7 hours, 43 minutes, 11.5 seconds. The *synodical*, or *proper lunar*, *month* is the time that elapses between new moon and new moon; average, 29 days, 12 hours, 44 minutes, 2.9 seconds. The *solar month* is the twelfth part of one solar year, or 30 days, 10 hours, 29 minutes, 5 seconds.

Monticello, *mon te sel' lo*, the name given by Thomas Jefferson to his home and estate in Albemarle County, Va., about 3 miles east of Charlottesville. The mansion was first occupied in 1770, while still under construction, and it was planned by Jefferson himself. It was his residence for fifty-six years, but it was sold shortly after his death by his heirs.

Montluçon, *mohN lu sohN'*, a town in France, on the Cher River. It is the most important industrial city of central France and has manufactures of glass, steel, iron, chemicals and woolen goods. The trade in grain, corn and fruit is considerable. Population in 1901, 32,661.

Montmorency, *mont mo ren' sy*, a small river of Canada, which rises in Snow Lake, in the Province of Quebec, flows south and joins the Saint Lawrence 6½ mi. below Quebec. Near its mouth are the Falls of Montmorency, which have a breadth of about 150 feet and a perpendicular descent of 265 feet.

Montpelier, *Vr.*, the capital of the state and the county-seat of Washington co., 40 mi. s. e. of Burlington, on the Winooski River and on the Central Vermont, the Montpelier & Wells River and other railroads. The city contains a handsome capitol, a granite structure built in the form of a cross and surmounted by a dome rising to a height of 124 feet. It also contains the Heaton Hospital, the state library, Wood Art Gallery, Kellogg-Hubbard Library, Montpelier Seminary and a state arsenal. There is a large trade with the surrounding country, and the principal industries are granite dressing and the manufacturing of saddlery, hardware and machinery. The place was first settled by people from Massachusetts in 1787, was made a town four years later and became the capital of the state in 1805. It was chartered as a city in 1894. Population in 1900, 6266.

Montpellier, *mohN pel lyay'*, a city of France, the capital and largest town of the Department of Hérault, situated on the *Lez*, 76 mi. w. n. w. of Marseilles. It is one of the most beautiful towns in the south of France and is

located in a rich and fertile district. Since the twelfth century it has been famous for its school of medicine, said to have been founded by Arab physicians driven out of Spain. The botanical garden, begun under Henry IV, is the oldest in Europe. Among the buildings most worthy of note are the cathedral, built during the fourteenth century; the episcopal palace, now occupied by the school of medicine; the theater, the exchange, and the university buildings. Montpellier has manufactures of cotton and woolen goods, candles, chocolate, soap, chemicals, perfumes and spirits. It carries on an active trade, Cette serving as its harbor. The city was a stronghold of the Huguenots and suffered much in the religious wars. Population in 1901, 75,950.

Montreal, *mon tre awl'*, the largest city and the commercial metropolis of the Dominion of Canada, situated on the island of Montreal, formed by the mouths of the Ottawa, where it empties into the Saint Lawrence. Montreal is built upon the southern side of the island, 180 miles southwest of Quebec. Behind the town rises Mount Royal (Mont Réal), from which it derives its name, and a part of which is reserved as a public park. Situated at the junction of the inland and the ocean navigation, the city has a harbor with three miles of wharfage, accessible to steamers of the deepest draught. There are numerous lines of steamships which have their Canadian headquarters at Montreal. It is also the chief terminus of the Grand Trunk railway and the eastern terminus of the Canadian Pacific railway.

The city, which is one of the most attractive in Canada, contains many handsome public buildings and is divided into distinctly marked English and French quarters. The chief public buildings are the courthouse, Bonsecours Market, the customhouse, the city hall and the postoffice. The principal churches are the Cathedral of Saint James, constructed on the model of Saint Peter's at Rome; the Church of Notre Dame de Lourdes, the largest in America, and the Church of Saint Gabriel. The exports are chiefly the products of the country, such as grain, flour, cheese and lumber and there is a large trade in furs. The principal imports are cottons, woolens and silks, iron and hardware, tea and sugar. Among the industrial establishments of Montreal are iron foundries, distilleries, breweries, sugar refineries, soap and candle works; and there are manufactures of cotton, silk, boots and shoes, paper, carpets,

tobacco, hardware, edge tools, floor cloth and carriages.

Montreal was founded, under the name of Ville Marie de Montréal, in 1642, on the site of the Algonquin village, Hochelaga. It came into the hands of the English in 1760, when it was taken from the French by General Amherst. It was the seat of government of Lower Canada until 1849, in which year it was superseded by Quebec. Population in 1909, 385,000.

Montreal, an island of Canada, in the Saint Lawrence River, at its junction with the Ottawa. It is about 30 miles long and 10 miles broad and contains the city of Montreal. The surface is generally level, and the soil is for the most part fertile and well cultivated.

Montrose, *mon troze'*, JAMES GRAHAM, First Marquis of (1612-1650), a Scottish general. At the outbreak of the war against Charles I, he was on the side of the Covenanters, because he fancied he had been slighted by the king, but in 1639 he was one of the leaders who were appointed to confer with Charles I, and after that he went over to the royalist side, was created a marquis and was made commander of the royal forces in Scotland. With an army partly composed of Irish and Highlanders, he gained several battles in rapid succession and captured Dundee and Edinburgh; but he was defeated by David Leslie. He fled to the continent, and in 1650 he landed in Orkney with a small body of followers. He failed, however, in raising an army, and a few months later he was taken and hanged.

Moody, DWIGHT LYMAN (1837-1899), an American evangelist, born in Northfield, Mass. At the age of nineteen he engaged in missionary work. During the Civil War and afterward, he was a conspicuous missionary agent of the Y. M. C. A. in Chicago, where a large non-sectarian church was organized, with Moody, though not ordained, as its pastor. He met with phenomenal success. In 1873, accompanied by Ira D. Sankey, he visited Europe, where their services resulted in great religious awakenings. In 1879 Moody opened a seminary for girls at Northfield, Mass., and in 1881 a seminary for boys. He also organized a summer school in 1890.

Moody, WILLIAM HENRY (1853-), an American lawyer and politician, born at Newbury, Mass. He graduated at Phillips Academy, Andover, Mass., and at Harvard University, afterward entering the law. He was appointed United States district attorney in 1890 and was later chosen to Congress, serving four terms.

Moon

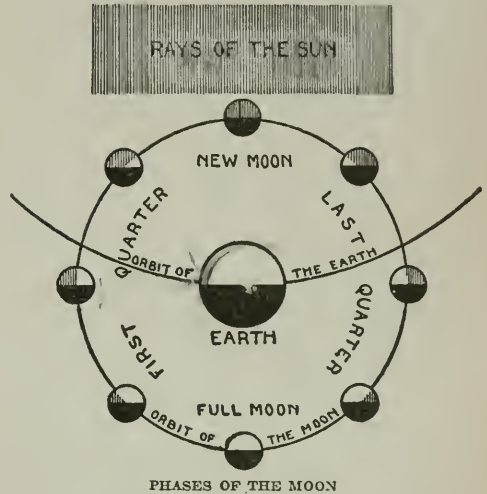
In May, 1902, he was made secretary of the navy and held that position until 1904, when he became attorney-general of the United States. In 1907 he was appointed to the Supreme Court.

Moon, the satellite of the earth, revolving round the latter in an almost circular orbit, thus accompanying the earth in its revolution round the sun. The mean diameter of the moon is about 2160 miles, or $\frac{1}{4}$ that of the earth. Its surface is about $\frac{1}{13}$ that of the earth; its volume, $\frac{1}{49}$; its mass, $\frac{1}{81}$, and its mean density, a little more than $\frac{1}{2}$. A mass weighing one pound on the earth's surface would weigh less than three ounces on the moon's surface. No other heavenly body excepting meteors is so near to us. The average distance of the moon from the earth is about 240,000 miles. While the moon is making a revolution around the earth, it turns once on its axis and, accordingly, it always presents the same side to us. Exactly 27 days, 7 hours, 43 minutes and $7\frac{1}{2}$ seconds, known as the sidereal month, are required for this revolution. The lunar month, or the time from one new moon to another, is a little more than 2 days longer.

The moon is a dark globe and receives all its light from the sun. This light reflected toward us makes the moon visible. When the moon is between us and the sun, its dark side is toward us, and it is invisible. This is the period of the new moon. When the moon has moved to a point at right angles with the sun, it is in the middle of its first quarter and we see one-half of the side of it. When it is fully behind us, we see the full moon, or one-half of the moon's surface. When it is again moved to a right angle, we see again a quarter of the moon's surface. The *new moon* is the thin crescent seen in the west. If the sky is clear, we may then see the entire circle of the moon, the dark parts shining dimly by light reflected from the earth to the moon. The changes in the appearance of the moon are known as phases. A study of the accompanying diagram will make the causes of the different phases of the moon clear, if the reader will remember that the source of light is in the rays of the sun above the cut, and that the portions of the moon which are visible on the earth are white and the invisible parts are black. An eclipse of the moon occurs when it passes into the earth's shadow; when it prevents the sun being seen, there is an eclipse of the sun (See ECLIPSE). With the naked eye we can see dark objects on the moon, often said to resemble the continents of the earth and also likened to

Moon

the face of a man, "the man in the moon." Viewed through a telescope, the surface of the moon is seen to be dotted by mountains, many of which have been named after eminent scientific men. They are sometimes detached in precipitous peaks, but more frequently they form vast continuous ranges. The most prevalent



form is that of the crater, sometimes eight to ten miles in diameter and showing evident traces of volcanic action. These craters look like circular forts, with walls sometimes two or three miles high. The interior of these rings is not usually flat and smooth, and oftentimes a mountainous cone rises from the center. Certain crater-like formations which have still greater diameter are generally spoken of as walled plains. Larger still are the gray plains which were at one time taken for seas, before the absence of water from the lunar surface was demonstrated. They may possibly be the floors of old seas. Some of the mountains have been estimated to be over 24,000 feet in height. Other peculiar ridges of comparatively small elevation extend to great distances, connecting different ranges or craters. There are also valleys of various sizes, and "faults," or closed cracks, sometimes of considerable length. In reading descriptions of the appearance of the moon, it should be remembered that the highest telescopic power yet applied to that planet is only equivalent to bringing it within about 40,000 miles of the naked eye.

As the moon rotates so slowly on its axis, its days and nights are each about 14 of our days long. During the lunar day the heat must be

intense, and during its night, the cold is equally severe. No astronomer has ever been able to detect any water on the moon or any moisture or air surrounding it. With no water or air, human beings cannot exist on the moon; few changes of any sort can take place.

The influence of the moon on the earth and its affairs has always been thought to be great. At one time it was supposed to govern the weather; the time of planting and harvesting were regulated by its phases, and man superstitiously looked to the moon to regulate his affairs. While such things are believed no longer, it is known that the moon does exert remarkable physical influences on the earth. See **TIDES**.

Moon'stone, a whitish variety of feldspar. See **FELDSPAR**.

Moore, JOHN, Sir (1761–1809), a celebrated British general, born at Glasgow. He had seen considerable service in the West Indies, Ireland, Holland and Egypt before 1808, when he was appointed commander in chief of the British army in Portugal, to operate against Napoleon. The failure of the Spanish army to coöperate heartily with him rendered many of his plans ineffective, but he advanced to Salamanca in spite of the gravest difficulties, only to learn of the fall of Madrid and the advance of a great army under Napoleon. He retreated to Coruña, a distance of over two hundred miles, but there found himself obliged to face Soult. The English army was victorious, but Moore was killed in the battle.

Moore, THOMAS (1779–1852), an Irish poet, born in Dublin. From Trinity College, Dublin, he passed in 1799 to the Middle Temple in London, nominally to study law; but he almost immediately showed his preference for literature, and his *Anacreon* was published not long after his arrival in London. His next venture, the *Poetical Works of the Late Thomas Little*, though partly written in a licentious vein, which he afterward regretted, increased his reputation; and in 1803 he obtained the office of registrar of the admiralty court at Bermuda. Moore went out, but almost immediately appointed a deputy and returned to England. In 1806 he published his *Odes and Epistles*. In 1807 Moore agreed to write words for a number of Irish national airs, arranged by Sir John Stevenson. In these *Irish Melodies*, which were not finished till 1834, he found the work for which his genius was peculiarly fitted, and it is on them that his poetic reputation will mainly rest. His most

ambitious work, the Eastern romance of *Lalla Rookh*, was published in 1817 and brought its author \$15,000. The *Life of Sheridan* was produced in 1825, and *The Epicurean*, a prose romance, in 1827. Next came the *Life of Lord Byron*, for which he received nearly \$25,000, and the *Life of Lord Edward Fitzgerald*. His remaining works include *The Twopenny Post Bag*, lampoons on the prince-regent and his supporters; the humorous verses called *The Fudge Family in Paris*; *The Loves of the Angels*, and a *History of Ireland*.

Moors, a Mohammedan, Arabic-speaking race of mixed descent, forming part of the population of the Barbary States. The modern Moors have sprung from a union of the ancient inhabitants of this region with their Arab conquerors, who appeared in the seventh century. As the Mohammedan conquerors of the Visigoths in Spain (711–713) came from North Africa, the name Moor was also applied to them by Spanish chroniclers, and in that connection it is synonymous with Arab and Saracen. These Moors pushed northward into France, until their repulse by Charles Martel at the great Battle of Tours, in 732, after which they practically restricted themselves to Spain south of the Ebro. Here, for centuries, art, science, literature and chivalry flourished among them, while the rest of Europe was still in the Dark Ages. Their internal dissensions and divisions, however, weakened them in face of the new Christian kingdoms of Aragon and Castile, and before the close of the thirteenth century their possessions were limited to the kingdom of Granada (See **ALHAMBRA**). This, too, was finally subdued by Ferdinand, in 1492; and while great numbers of the Moors emigrated to Africa, the remainder, under the name of Moriscos, assuming in great part a semblance of Christianity, submitted to the Spaniards. Philip II, however, excited a sanguinary insurrection among the Moors in 1568–1570, which was followed by the banishing of many thousands, and Philip III completed the work in 1610 by finally expelling the last of these, the most ingenious and industrious of his subjects. The expulsion of the Moors was one of the chief causes of the decadence of Spain; for both agriculture and industries fell into decay after their departure. The expelled Moors founded cities in Africa, and these developed into the states of Barbary, whose piratical depredations ceased only in the nineteenth century.

